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THE LITTLE BOOK OF VALUATION



How to Value a Company, Pick a Stock, and Profit

ASWATH DAMODARAN

Updated Edition



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To all of those who have been subjected to my long discourses on valuation, this is my penance.

Foreword

Do you know what a share in Google, Tesla or NVidia is really worth? What about that condo or house you just bought? Should you care? Knowing the value of a stock, bond, or property may not be a prerequisite for successful investing, but it does help individual investors like you make more informed judgments.

Most investors see valuing an asset as a daunting task—something far too complex and complicated for their skill sets. Consequently, they leave it to the professionals (equity research analysts, appraisers) or ignore it entirely. I believe that valuation, at its core, is simple and anyone who is willing to spend time collecting information and analyzing it, can do it. I hope to show you how in this book. I also hope to strip away the mystique from valuation practices and provide ways in which you can look at valuation judgments made by analysts and appraisers and decide for yourself whether they make sense or not.

While valuation models can be filled with details, the value of a company rests on a few key drivers, which may vary from company to company. In the search for these **value drivers**, I will look not only across the life cycle from young, growth firms such as Zomato, an Indian online food delivery company, to mature companies like Unilever, but also across diverse sectors from commodity companies like Royal Dutch to financial service companies like Citigroup. In a webpage to accompany this book and on a mobile app, you can not only look at the spreadsheets containing these valuations, but you can also change or update the numbers and see the effects. In addition, the webpage gives you access to more resources that you can use, if you want to dig deeper.

Here is the bonus: if you understand the value drivers of a business, you can also start to identify **value plays**: stocks that are investment bargains. By the end of the book, I would like you to be able to assess the value of any company or business that you

are interested in buying and use this understanding to become not only a more informed investor but also a more successful one. Will that make you a successful investor or earn you riches? Not necessarily, but it will give you the tools to avoid investing mistakes and to spot investment scams.

Let's hit the road!

Hit the Ground Running— Valuation Basics

Chapter One



Value—More than a Number!: *Understanding* the Terrain

OSCAR WILDE DEFINED A CYNIC AS ONE WHO "knows the price of everything and the value of nothing." The same can be said of many investors who regard investing as a game and define winning as staying ahead of the pack.

A postulate of sound investing is that an investor does not pay more for an asset than it is worth. If you accept this proposition, it follows that you must at least try to value whatever you are buying before buying it. I know there are those who argue that value is in the eyes of the beholder and that any price can be justified if there are other investors who perceive an investment to be worth that amount. That is patently absurd. Perceptions may be all that matter when the asset is a painting or a sculpture, but you buy financial assets for the cash flows that you expect to receive. The price of a stock cannot be justified by merely using the argument that there will be other investors around who will pay a higher price in the future. That is the equivalent of playing an expensive game of musical chairs, and the question becomes: Where will you be when the music stops?

Two Approaches to Valuation

Ultimately, there are dozens of valuation models but only two valuation approaches: *intrinsic* and *relative*. In *intrinsic*

valuation, we begin with a simple proposition: the intrinsic value of an asset is determined by the cash flows you expect that asset to generate over its life and how uncertain you feel about these cash flows. Assets with high and stable cash flows should be worth more than assets with low and volatile cash flows. You should pay more for a property that has long-term renters paying a high rent than for a more speculative property with not only lower rental income but more variable vacancy rates from period to period.

While the focus in principle should be on intrinsic valuation, most assets are valued on a relative basis. In *relative valuation*, assets are valued by looking at how the market prices similar assets. Thus, when determining what to pay for a house, you would look at what similar houses in the neighbourhood sold for. With a stock, that means comparing its pricing to similar stocks, usually in its "peer group." Thus, Exxon Mobil will be viewed as a stock to buy if it is trading at 8 times earnings while other oil companies trade at 12 times earnings. Since this approach to putting a number on a business or asset is philosophically different from intrinsic valuation and determined less by fundamentals and more by what other people are willing to pay, we will use the term "pricing" to describe relative valuation.

Intrinsic valuation provides a fuller picture of what drives the value of a business or stock, but there are times when pricing will yield a more realistic estimate of what you can get for that business or stock in the market today. While nothing stops you from using both approaches to put a number on the same investment, it is imperative that you understand whether your mission is to value an asset or to price it, since the tool kit that you will need is different.

Why Should You Care?

Investors come to the market with a wide range of investment philosophies. Some are market timers looking to buy before market upturns while others believe in picking stocks based on growth and future earnings potential.

Some pore over price charts and classify themselves as

technicians, whereas others compute financial ratios and swear by fundamental analysis, in which they drill down on the specific cash flows that a company can generate and derive a value based on these cash flows. Some invest for short-term profits and others for long-term gains. Knowing how to value assets is useful to all these investors, though its place in the process will vary. Market timers can use valuation or pricing tools at the start of the process to determine whether a group or class of assets (stocks, bonds, or real estate) is under- or overvalued, while stock pickers can draw on valuations of individual companies to decide which stocks are cheap and which ones are expensive. Even technical analysts (including chartists) can use valuations to detect shifts in momentum when a stock on an upward path changes course and starts going down or vice versa.

Increasingly, though, the need to assess value and price has moved beyond investments and portfolio management. There is a role for valuation and pricing at every stage of a firm's life cycle. For small private businesses thinking about expanding, pricing and valuation play a key role when they approach venture capital and private equity investors for more capital. The share of a firm that venture capitalists will demand in exchange for a capital infusion will depend on the value (pricing) they estimate for the firm. As the companies get larger and decide to go public, your assessments of what it is worth will determine the prices at which they are offered to the market in the public offering. Once established, decisions on where to invest, how much to borrow, and how much to return to the owners will all be affected by perceptions of their impact on value. Even accounting is not immune. The most significant global trend in accounting standards is a shift toward fair value accounting, where assets are valued on balance sheets at their fair values rather than at their original cost. Thus, even a casual perusal of financial statements requires an understanding of valuation fundamentals and pricing basics.

Some Truths about Valuation

Before delving into the details of valuation, it is worth noting some general truths about valuation that will provide you not only with

perspective when looking at valuations done by others but also with some comfort when doing your own.

All Valuations Are Biased

You almost never start valuing a company or stock with a blank slate. All too often, your views on a company or stock are formed before you start inputting the numbers into the models and metrics that you use and, not surprisingly, your conclusions tend to reflect your biases.

The bias in the process starts with the companies you choose to value. These choices are not random. It may be that you have read something in the press (good or bad) about the company or heard from a talking head that a particular company was under- or overvalued. It continues when you collect the information you need to value the firm. The annual report and other financial statements include not only the accounting numbers but also management discussions of performance, often putting the best possible spin on the numbers.

With professional analysts, there are *institutional factors* that add to this already substantial bias. Equity research analysts, for instance, issue more buy than sell recommendations because they need to maintain good relations with the companies they follow and because of the pressures that they face from their own employers, who generate other business from these companies. To these institutional factors, add the *reward and punishment structure* associated with finding companies to be under- and overvalued. Analysts whose compensation is dependent on whether they find a firm to be cheap or expensive will be biased in that direction.

The inputs that you use in the valuation will reflect your optimistic or pessimistic bent; thus, you are more likely to use higher growth rates and see less risk in companies that you are predisposed to like. There is also *post-valuation garnishing*, where you increase your estimated value by adding premiums for the good stuff (synergy, control, and management quality) or reduce your estimated value by netting out discounts for the bad stuff

(illiquidity and risk).

Always be honest about your biases: Why did you pick this company to value? Do you like or dislike the company's management? Do you already own stock in the company? Put these biases down on paper, if possible, before you start. In addition, confine your background research on the company to information sources rather than opinion sources; in other words, spend more time looking at a company's financial statements than reading equity research reports about the company. If you are looking at someone else's valuation of a company, always consider the reasons for the valuation and the potential biases that may affect the analyst's judgments. Generally, the more bias there is in the process, the less weight you should attach to the valuation judgment.

Valuations (Even Good Ones) Are Wrong

Starting early in life, you are taught that if you follow the right steps and use the right models, you will get the correct answer and that if the answer is imprecise, you must have done something wrong. While precision is a good measure of process quality in mathematics or physics, it is a poor measure of quality in valuation. Your best estimates for the future will not match up to the actual numbers for several reasons. First, even if your information sources are impeccable, you must convert raw information into forecasts, and any mistakes that you make at this stage will cause estimation error. Next, the path that you envision for a firm can prove to be hopelessly off. The firm may do much better or much worse than you expected it to perform, and the resulting earnings and cash flows will be different from your estimates; consider this firm-specific uncertainty. When valuing Cisco in 2001, for instance, we seriously underestimated how difficult it would be for the company to maintain its acquisitiondriven growth in the future, and we overvalued the company as a consequence. Finally, even if a firm evolves exactly the way you expected it to, the macroeconomic environment can change in unpredictable ways. Interest rates can go up or down, and the economy can do much better or worse than expected. Our

valuation of Marriott from November 2019 looks hopelessly optimistic, in hindsight, because we did not foresee the global pandemic in 2020 and the economic consequences for the hospitality business.

The amount and type of uncertainty that you face can vary across companies, with consequences for investors. One implication is that you cannot judge a valuation by its precision, since you will face more uncertainty when you value a young growth company than when you value a mature company. Another is that avoiding dealing with uncertainty will not make it go away. Refusing to value a business because you are too uncertain about its future prospects makes no sense, since everyone else looking at the business faces the same uncertainty. Finally, collecting more information and doing more analysis will not necessarily translate into less uncertainty, since the uncertainty does not just come from estimation mistakes but also reflects real uncertainty about the future.

Simpler Can Be Better

Valuations have become more and more complex over the last two decades because of two developments. On the one side, computers and calculators are more powerful and accessible than they used to be, making it easier to analyze data. On the other side, information is both more plentiful and easier to access and use.

A fundamental question in valuation is how much detail to bring into the process, and the trade-off is straightforward. More detail gives you a chance to use specific information to make better forecasts, but it also creates the need for more inputs, with the potential for error on each one, and it generates more complicated and opaque models. Drawing from the principle of parsimony, common in the physical sciences, here is a simple rule: when valuing an asset, use the simplest model that you can. If you can value an asset with three inputs, don't use five. If you can value a company with three years of forecasts, forecasting 10 years of cash flows is asking for trouble. Less is more.

Start Your Engines!

Most investors choose not to value companies and offer a variety of excuses: valuation models are too complex, there is insufficient information, or there is too much uncertainty. While all these reasons have a kernel of truth to them, there is no reason why they should stop you from trying. Valuation models can be simplified, and you can make do with the information you have and—yes—the future will always be uncertain. In hindsight, will you be wrong? Of course, but so will everyone else. Success in investing comes not from being right but from being less wrong than everyone else.

Chapter Two



Power Tools of the Trade: Time Value, Risk, and Statistics

SHOULD YOU BUY NVIDIA (NVID), a company that pays no dividends now but has great growth potential and lots of uncertainty about its future, or Altria (MO), a high dividend—paying company with limited growth prospects and stable income? Is Altria cheap, relative to other tobacco companies? To make these assessments, you must compare cash flows today to cash flows in the future, to evaluate how risk affects value, and be able to deal with a large amount of information. The tools to do so are provided in this chapter.

Time Is Money

The simplest tools in finance are often the most powerful. The notion that a dollar today is preferable to a dollar in the future is intuitive enough for most people to grasp without the use of models and mathematics. The principles of *present value* enable us to calculate exactly how much a dollar sometime in the future is worth in today's terms and to compare cash flows across time.

There are three reasons why a cash flow in the future is worth less than a similar cash flow today.

- 1. People prefer consuming today to consuming in the future.
- 2. Inflation decreases the purchasing power of cash over time. A

dollar in the future will buy less than a dollar would today.

3. A promised cash flow in the future may not be delivered. There is risk in waiting.

The process by which future cash flows are adjusted to reflect these factors is called discounting, and the magnitude of these factors is reflected in the *discount rate*. The discount rate can be viewed as a composite of the expected *real return* (reflecting consumption preferences), expected inflation (to capture the purchasing power of the cash flow), and a premium for uncertainty associated with the cash flow.

The process of discounting converts future cash flows into cash flows in today's terms. There are five types of cash flows—simple cash flows, annuities, growing annuities, perpetuities, and growing perpetuities.

A *simple cash flow* is a single cash flow in a specified future period. Discounting a cash flow converts it into today's dollars (or present value) and enables the user to compare cash flows at different points in time. The present value of a cash flow is calculated thus:

Present Value =
$$\frac{\text{Cash flow in future period}}{\left(1 + \text{Discount rate}\right)^{\text{Number of periods}}}$$

Thus, the present value of \$1,000 in 10 years, with a discount rate of 8 percent, is:

$$\frac{1000}{\left(1.08\right)^{10}} = \$463.19$$

Other things remaining equal, the present value of a cash flow in the future will decrease the further into the future it is and the more uncertain you feel about getting it.

An *annuity* is a constant cash flow that occurs at regular intervals for a finite period. While you can compute the present value by discounting each cash flow and adding up the numbers, you can also use this equation:

$$Annual \ cash \ flow \left[\frac{1 - \frac{1}{\left(1 + Discount \ rate\right)^{Number \ of \ periods}}}{Discount \ rate} \right]$$

To illustrate, assume again that you have a choice of buying a car for \$10,000 cash down or paying installments of \$3,000 a year, at the end of each year, for five years, for the same car. If the discount rate is 12 percent, the present value of the installment plan is:

$$\$3,000 \left[\frac{1 - \frac{1}{(1.12)^5}}{.12} \right] = \$10,814$$

The cash-down plan costs less, in present value terms, than the installment plan. This equation can be adapted to allow for cash flows that occur at the start of the year, and all it requires is that the present value be compounded by the discount rate of 12% for a year, yielding a value of \$12,112 ($$10,814 \times 1.12$).

A *growing annuity* is a cash flow that grows at a constant rate for a specified period. Suppose you have the rights to a goldmine that generated \$1.5 million in cash flows last year and is expected to continue to generate cash flows for the next 20 years. If you assume a growth rate of 3 percent a year in the cash flows, either from higher gold prices or more production, and a discount rate of 10 percent to reflect your uncertainty about these cash flows, the present value of the gold from this mine is \$16.146 million; this value will increase as the growth rate increases and will decrease as the discount rate rises. ¹

A *perpetuity* is a constant cash flow at regular intervals *forever*, and the present value is obtained by dividing the cash flow by the discount rate.

$$PV = \frac{Cash\ flow\ each\ period}{Discount\ rate}$$

The most common example offered for a perpetuity is a *console bond*, a bond that pays a fixed interest payment (or coupon) forever. The value of a console bond that pays a \$60 coupon each year if the interest rate is 9 percent is as follows:

A *growing perpetuity* is a cash flow that is expected to grow at a constant rate forever. The present value of a growing perpetuity can be written as:

Although a growing perpetuity and a growing annuity share several features, the fact that a growing perpetuity lasts forever puts constraints on the growth rate. The growth rate must be less than the discount rate for the equation to work, but an even tighter constraint is that the growth rate used must be lower than the nominal growth rate of the economy, since no asset can have cash flows growing faster than that rate forever.

Consider a simple example. Assume that you are assessing a stock that paid \$2 as dividends last year. Assume that you expect these dividends to grow 2 percent a year in perpetuity, and that your required rate of return for investing in this stock, given its risk, is 8 percent. With these inputs, you can value the stock using a perpetual growth model:

$$\frac{\text{Expected dividends next year}}{\text{Required Return} - \text{Expected growth rate}} = \frac{\$2(1.02)}{(.08 - .02)} = \$34.00$$

These cash flows are the essential building blocks for virtually every financial asset. Bonds, stocks, or real estate properties can ultimately be broken down into sets of cash flows. If you can discount these cash flows, you can value all these assets.

Grappling with Risk

When stocks were first traded in the 16th and 17th centuries, there was little access to information and few ways of processing that limited information. Only the very wealthy invested in stocks, and even they were susceptible to scams. As new investors entered the financial markets at the start of the 20th century, services started to collect return and price data on individual securities and to compute basic measures of risk, though these measures remained for the most part simplistic. For instance, a railroad stock that paid a large dividend was considered less risky than stock in a manufacturing or shipping venture.

In the early 1950s, a doctoral student at the University of Chicago named Harry Markowitz noted that the risk of a portfolio could be written as a function not only of how much was invested in each security and the risks of the individual securities but also of how these securities moved together. If securities that move in different directions are in the same portfolio, he noted that the risk of the portfolio could be lower than the risk of individual securities and that investors should get a much better trade-off from taking risk by holding diversified portfolios than by holding individual stocks.

To illustrate this, consider the risks you are exposed to when you invest in a company such as Disney (DIS). Some of the risks you face are specific to the company: its next big-budget Marvel movie may do better than expected and its newest theme park in Shanghai may draw fewer visitors than projected. Some of the risks affect not just Disney but its competitors in the business: legislation that changes the nature of the broadcasting business can alter the profitability of Disney's networks (ABC and ESPN) or its Disney Plus streaming network, and the ratings on these platforms will be determined by the strength of its content, relative to competitors. Still other risks come from macroeconomic factors and affect most or all companies in the market to varying degrees: rising interest rates or an economic recession will put a dent in the profitability of all companies. Take note that you can get better or worse news than expected on each of these dimensions. If you invest all your money in Disney, you are exposed to all these risks. If you own Disney as part of a larger portfolio of many stocks, the risks that affect one or a few firms will get averaged out in your

portfolio: for every company where something worse than expected happens, there will be another company where something better than expected will happen. The macroeconomic risk that affects many or most firms cannot be diversified away. As a diversified investor, this *market risk* is the only risk that you should consider as an investor in a publicly traded company.

If you accept the Markowitz proposition that the only risk you care about is the risk that you cannot diversify away, how do you measure the exposure of a company to this market-wide risk? The most widely used model is the capital asset pricing model, or CAPM, developed in the early 1960s. In this model, you assume that investors face no transaction costs and share the same information. Since there is no cost to diversifying and no gain from not doing so, each investor holds a supremely diversified portfolio composed of all traded assets (called the *market portfolio*). The risk of any asset then becomes the risk added to this "market portfolio," which is measured with a *beta*. The beta is a relative risk measure, and it is standardized around one; a stock with a beta above one is more exposed to market risk than the average stock, and a stock with a beta below one is less exposed. The *expected return* on the investment can then be written as:

Risk-free rate + beta × (Risk premium for average risk investment)

The CAPM is intuitive and simple to use, but it is based on unrealistic assumptions. To add to the disquiet, studies over the last few decades suggest that CAPM betas do not do a very good job in explaining differences in returns across stocks. Consequently, three classes of models have developed as alternatives to the CAPM. The first are multi-beta models, which measure the risk added by an investment to a diversified portfolio, with many betas (rather than the single beta), and with each beta measuring exposure to a different type of market risk (with its own risk premium). The second are proxy models, which look at the characteristics (such as market capitalization and price-to-book ratio) of companies that have earned high returns in the past and use those as measures of risk. Finally, to the extent that you want your risk measure to reflect fundamentals, you may estimate the risk of a company by looking at the stability of its operations and earnings.

It is indisputable that all these models are flawed, either because they make unrealistic assumptions or because the parameters cannot be estimated precisely. However, there is no disputing that:

- *Risk matters*. Even if you don't agree with portfolio theory, you cannot ignore risk while investing.
- Some investments are riskier than others. If you don't use beta as a measure of relative risk, you must come up with an alternative measure of relative risk.
- The price of risk affects value, and markets set this price.

You may not buy into the CAPM or multi-beta models, but you must devise ways of measuring and incorporating risk into your investment decisions.

Accounting 101

There are three basic accounting statements. The first is the balance sheet, which summarizes the assets owned by a firm, the value of these assets, and the mix of debt and equity used to fund them, at a point in time. The income statement provides information on the operations of the firm and its profitability over time. The statement of cash flows specifies how much cash the firm generated or spent from its operating, financing, and investing activities.

How do accountants measure the value of assets? For most *fixed* and *long-term assets*, such as land, buildings, and equipment, they begin with what you originally paid for the asset (historical cost) and reduce that value for the aging of the asset (depreciation or amortization). For *short-term assets* (current assets), including inventory (raw materials, works in progress, and finished goods), receivables (summarizing moneys owed to the firm), and cash, accountants are more amenable to the use of an updated or market value. If a company invests in the securities or assets of another company, the investment is valued at an updated market value if the investment is held for trading and historical cost when it is not.

In the special case where the holding comprises more than 50 percent of the value of another company (subsidiary), the firm must record all of the subsidiary's assets and liabilities on its balance sheet (this is called *consolidation*), with a *minority interest* item capturing the percentage of the subsidiary that does not belong to it. Finally, you have what are loosely categorized as *intangible assets*. While you would normally consider items such as brand names, customer loyalty, and a well-trained work force as intangible assets, the most encountered intangible asset in accounting is goodwill. When a firm acquires another firm, the price it pays is first allocated to the existing assets of the acquired firm. Any excess paid becomes goodwill and is recorded as an asset. If the accountants determine that the value of the target company has dropped since the acquisition, this goodwill must be decreased or impaired.

Just as with the measurement of asset value, the accounting categorization of liabilities and equity is governed by a set of rigid principles. *Current liabilities* include obligations that the firm has coming due in the next accounting period, such as accounts payable and short-term borrowing, and these items are usually recorded at their current market value. *Long-term debt*, including bank loans and corporate bonds, are generally recorded at the face value at the time of issue and are generally not marked-to-market. Finally, the accounting measure of equity shown on the balance sheet reflects the original proceeds received by the firm when it issued the equity, augmented by any earnings made since then (or reduced by losses, if any) and reduced by any dividends paid out and stock buybacks. Figure 2.1 summarizes the principles that generally govern accounting balance sheets:

Two principles underlie the measurement of accounting earnings and profitability. The first is *accrual accounting*, where the revenue from selling a good or service is recognized in the period in which the good is sold or the service is performed (in whole or substantially), and a corresponding effort is made to match expenses incurred to generate revenues. The second is the categorization of expenses into *operating*, *financing*, *or capital expenses*.

Assets		Liabilities		
Recorded at cost	Non-Cash Current Assets	Current Liabilities	Recorded at cost	
Recorded at current value	Cash & Marketable Securities (ST)	Interest-bearing		
Recorded at original cost, net of depreciation	Property, Plant & Equipment	Debt	Recorded as original proceed	
Recorded at original cost, updated cost or priced at current market levels	Financial Investments	Accounting Liabilities	Recorded at estimated value	
Mostly a plug variable (Goodwill)	Intangible Assets	Shareholder Equity	Summation of accounting history, book value + retained earnings	

Figure 2.1 Accounting Balance Sheet

- Operating expenses are expenses that at least in theory provide benefits only for the current period; the cost of labor and materials expended to create products that are sold in the current period is a good example.
- Financing expenses are expenses arising from the non-equity financing used to raise capital for the business; the most common example is interest expenses.
- Capital expenses are expected to generate benefits over multiple periods; for instance, the cost of buying machinery and buildings is treated as a capital expense and is spread over time as depreciation or amortization.

Netting operating expenses and depreciation from revenues yields *operating income*, whereas the income after interest and taxes is termed *net income*. Figure 2.2 reviews the sequence that accountants go through to arrive at net income:

	Item	Explanation
Start with	Revenues	Accountant's estimate of the revenues/sales generated by any transactions made by the business during the period
Net out	Cost of Goods Sold	Estimated costs that are directly associated with producing the product/service sold by the company
To get	Gross Profit	Unit profitability, before covering other indirect costs and financial expenses
Net out	Operating Expenses	Include all expenses associated with operations this year, with no benefits spilling over into future years
To get	Operating Profit	Profitability of business/operations
Net out	Financial Expenses	Expenses associated with non-equity financing (debt, for instance)
Add in	Financial Income	Income earned on cash balance and on financial investments (in companies and securties)
To get	Pretax Profit	Income to equity investors, prior to taxes
Net out	Taxes	Taxes, based upon taxable income (may not equate to cash taxes paid)
To get	Net Profit	Income to equity investors, after taxes

Figure 2.2 Accounting Income Statement

The accounting income statement measures accrual income, based on the revenues and expenses associated with transactions during a period, but it does not include capital expenses during the period. As a consequence, a company's cash flows can be different from its earnings, and the statement of cash flows represents the accounting attempt to measure cash flows to and from a business. That statement has three parts to it, with the operating cash flow segment estimating how much equity investors derived as cash flows from operations, adding back non-cash expenses and subtracting out changes in non-cash working capital items, the investing cash flow segment looking at capital expenditures and cash acquisitions and the financing segment focusing on cash flows to and from debt financing (debt issued and repaid) and to and from equity investors (new stock issuances and buybacks). Figure 2.3 breaks down the statement of cash flows into its constituent parts:

To measure profitability on a relative basis, you can scale profits to revenues to estimate *margins*, either from an operating standpoint (*operating margin* = operating income / sales) or to equity investors (*net margin* = net income / sales). Figure 2.4 reviews different measures of profit margins:

Cash Flow Effect	Item	Why?	
Start with	Net income	Equity Income	
Plus	Depreciation and amortization	Add back non-cash	
Plus	Other non-cash expenses	items	
	Change in accounts receivables		
	Change in inventory	Get to cash to equity	
Plus or Minus	Change in other current assets	from operations	
	Change in accounts payable	nom operations	
	Change in taxes due		
Equals	Cash flow from operations		
Cash Flow Effect	ltem	Why?	
Minus	Capital expenditures	******	
Plus	Divestitures of assets	Investment in operating	
Minus	Cash acquisitions	assets	
Minus	Investments in financial assets		
Minus	Investments in non-operating assets	Investment in non-	
Plus	Divestitures of securities	operating assets	
_	& non-operating assets		
Equals	Cash flow from investing		
Action	ltem	Why?	
Plus	Debt raised	,	
Minus	Debt repaid	Net cash from/to debt	
Plus	New equity Issuances		
Minus	Dividends paid	Net cash from/to equity	
Minus	Stock buybacks	investors	
Equals	Cash flow from financing		

Figure 2.3 Accounting Statement of Cash Flows

To measure how well a firm is investing its capital, we can look at the after-tax operating income relative to the *capital invested in the firm*, where capital is defined as the sum of the book values (BV) of debt and equity, net of cash, and marketable securities. This is the *return on capital* (ROC) or *return on invested capital* (ROIC) and it is computed as follows:

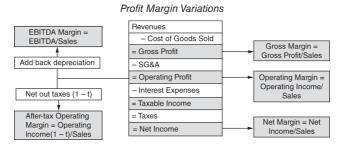


Figure 2.4 Profitability Scaled to Revenue (Margins)

$$After-tax\,ROC = \frac{Operating\,income\,(1-tax\,rate)}{BV\,of\,Debt + BV\,of\,Equity - Cash}$$

The return on capital varies widely across firms in different businesses, tending to be lower in competitive businesses. The *return on equity* (ROE) examines profitability from the perspective of the equity investors by relating profits to the equity investor (net profit after taxes and interest expenses) to the book value of the equity investment and can be computed as:

$$ROE = \frac{Net income}{Book value of common equity}$$

An accounting balance sheet is useful because it provides us with information about a firm's history of investing and raising capital, but it is backward looking. To provide a more forward-looking picture, consider an alternative, the financial balance sheet, as illustrated in Table 2.1.

While a financial balance sheet bears a superficial resemblance to the accounting balance sheet, it differs on two important counts. First, rather than classify assets based on asset life or tangibility, it categorizes them into investments already made by the company (assets in place) and investments that you expect the company to make in the future (growth assets). The second is that the values reflect not what has already been invested in these assets but their current values, based on expectations for the future. Since the assets are recorded at current value, the debt and equity values are also updated. Both US and international accounting standards are pushing toward "fair value" accounting. Put simply, this would lead to accounting balance sheets more closely resembling financial balance sheets.

Table 2.1 A Financial Balance Sheet

Measure	Explanation
Assets in place	Value of
	investments already
	made, updated to
	reflect their current
	cash flow potential

Growth assets	Value of
	investments the company is expected to make in the future (this rests on perceptions of
	growth opportunities)
Value of business	The value of a
	business is the sum of assets in place
	and growth assets.
Debt –	Lenders get first claim on cash flows,
	during operations,
	and cash proceeds,
Value of equity	in liquidation. Equity investors get
	whatever is left over after debt payments.

Making Sense of Data

The problem that we face in financial analysis today is not that we have too little information but that we have too much. Making sense of large and often contradictory information is part of analyzing companies. Statistics can make this job easier.

There are three ways to present data. The first and simplest is to provide the individual data items and let the user make sense of the data. Thus, an analyst who compares the price earnings (PE) ratio for a chemical company with the PE ratios of four similar chemical companies is using individual data. As the number of data items mounts, it becomes more difficult to keep track of individual data, and we look at ways to summarize the data. The most common of these summary statistics is the *average* across all data items, and the *standard deviation*, which measures the

spread, or deviation around the average. While summary statistics are useful, they can sometimes be misleading. Consequently, when presented with thousands of pieces of information, you can break the numbers down into individual values (or ranges of values) and indicate the number of individual data items that take on each value or range of values. This is called a *frequency distribution*. The advantages of presenting the data in a distribution are twofold. First, you can summarize even the largest data set into a distribution and get a measure of what values occur most frequently and the range of high and low values. The second is that the resulting distribution can resemble one of the many common statistical distributions. The normal distribution, for instance, is a symmetric distribution, with a peak centered in the middle of the distribution and tails that stretch to include infinite positive or negative values. Not all distributions are symmetric, though. Some are weighted toward extreme positive values and are positively skewed and some toward extreme negative values and are negatively skewed, as indicated in Figure 2.5.

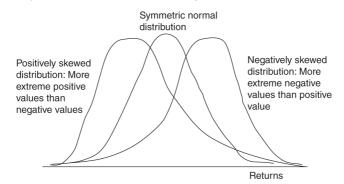


Figure 2.5 Normal and Skewed Distributions

Why should you care? With skewed distributions, the average may not be a good measure of what is typical. It will be pushed up (down) by the extreme positive (negative) values in a positively (negatively) skewed distribution. With these distributions, it is the *median*, the midpoint of the distribution (with half of all data points being higher and half being lower), which is the better indicator.

When looking at two series of data it is useful to know whether and how movements in one variable affect the other. Consider, for instance, two widely followed variables, inflation and interest rates, and assume that you want to analyze how they move together. The simplest measure of this co-movement is the *correlation*. If interest rates go up when inflation increases, the variables move together and have a positive correlation; if interest rates go down when inflation increases, they have a negative correlation. A correlation close to zero indicates that interest rates and inflation have no relationship to each other, whereas a correlation of one indicates that they move in lock step. While a correlation tells you how two variables move together, a *simple regression* allows you to go further. Assume, for instance, that you wanted to examine how changes in inflation affect changes in interest rates. You would start by plotting 10 years of data on interest rates against inflation in a *scatterplot*, as shown in Figure 2.6.

Each of the 10 points on the scatterplot represents a year of data, reflecting the inflation and interest rate in that year. In an ordinary least squares (OLS) regression, you find a best fit line, which minimizes the sum of the squared (vertical) distances of the points from the line. When the regression line is fit, two parameters emerge—one is the intercept of the regression, and the other is the slope of the regression line. Assume, in this case, that the regression output is as follows:

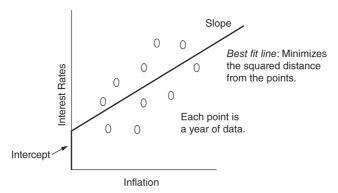


Figure 2.6 Scatterplot of Interest Rates against Inflation

Interest rate = 1.5% + 0.8 (Inflation rate); R Squared = 60%

The *intercept* measures the expected value that interest rates will

have when the inflation is zero; in this case, that value is 1.5 percent. The *slope* (b) of the regression measures how much interest rates are expected to change for every 1 percent change in inflation; in this case that value is 0.8 percent. When the two variables are positively (negatively) correlated, the slope will also be positive (negative). The regression equation can be used to estimate predicted values for the dependent variable. Thus, if you expect inflation to be 2 percent, the expected interest rate will be 3.1 percent $(1.5\% + 0.8 \times 2\% = 3.1\%)$. In a multiple regression, you extend this approach to try to explain a dependent variable with several independent variables. You could, for instance, attempt to explain changes in interest rates using both inflation and overall economic growth. With both simple and multiple regressions, the R-squared explains the percentage of the variation in the dependent variable that is explained by the independent variable or variables; thus, in our example above, 60 percent of the variation in interest rates can be explained by changes in inflation.

The Toolbox Is Full

You can get a lot done with the tools developed in this chapter. Time value concepts can be used to compare and aggregate cash flows across time on investments. Risk and return models in finance allow us to derive costs of investing in companies and, by extension, to value companies in different businesses. Much of the earnings and cash flow data come from financial statements. Finally, given the sheer quantity of information that we have to access, statistical measures that compress the data and provide a sense of the relationships between data items can provide invaluable insight. Let us take this valuation toolbox and go to work on specific companies.

Note

1 There is a present value equation that exists for this computation:

$$= Cash flow (1+g) \left[\frac{1 - \frac{(1+g)^n}{(1+r)^n}}{(r-g)} \right] = 1.5(1.03) \left[\frac{1 - \frac{1.03^{20}}{1.10^{20}}}{(.10 - .03)} \right] = 16.146$$

You can also arrive at the same number by computing the present value of each cash flow and adding up the numbers.

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Chapter Three



Yes, Virginia, Every Asset Has an Intrinsic Value: Determining Intrinsic Value

IMAGINE YOU ARE AN INVESTOR LOOKING to invest in a share of Kraft Heinz (KHC), a food processing company with some of the most recognized brand names in the world. Based on the information that you have on the company right now, you could estimate the expected cash flows you would get from this investment and assess the risk in those cash flows. Converting these expectations into an estimate of the value of KHC is the focus of this chapter.

Value the Business or Just the Equity?

In discounted cash flow valuation, you discount expected cash flows back at a risk-adjusted rate. When applied in the context of valuing a company, one approach is to value the entire business, with both existing investments and growth assets; this is often termed *firm*, *or enterprise*, *valuation*. The other approach is to focus on valuing just the equity in the business. Table 3.1 frames the two approaches in terms of the financial balance items introduced in Chapter 2.

Table 3.1 Valuation Choices

Measure	Explanation
Assets in place	*
_	

+	Growth assets	
=	Value of business	To value the entire
		business, discount
		the cash flows
		before debt
		payments (cash flow
		to the firm) by
		overall cost of
		financing, including
		both debt and equity
		(cost of capital).
_	Debt	From the value of
		the business,
		subtract out debt to
		get to equity.
=	Value of equity	To value equity
		directly, discount
		the cash flows left
		over after debt
		payments (cash
		flows to equity) at
		the cost of equity.

Put in the context of the question of whether you should buy shares in Kraft Heinz (KHC), here are your choices. You can value KHC as a business and subtract out the debt the company owes to get to the value of its shares. Or you can value the equity in the company directly, by focusing on the cash flows KHC has left over after debt payments and adjusting for the risk in the stock. Done right, both approaches should yield similar estimates of value per share.

Inputs to Intrinsic Valuation

There are four basic inputs that we need for a value estimate: cash flows from existing assets (net of reinvestment needs and taxes), expected growth in these cash flows for a forecast period, the cost

of financing the assets, and an estimate of what the firm will be worth at the end of the forecast period. Each of these inputs can be defined either from the perspective of the firm or just from the perspective of the equity investors. We will use KHC to illustrate each measure, using information from its 2022 annual report.

Cash Flows

The simplest and most direct measure of the cash flow you get from the company for buying its shares is dividends paid; KHC paid \$1,960 million in dividends in 2022. One limitation of focusing on dividends is that many companies do not pay dividends, and others have shifted from dividends to stock buybacks as their mechanism for returning cash to stockholders. While only those stockholders who sell their stock back receive cash, it still represents cash returned to equity investors. One simple way of adjusting for this is to *augment the dividend* with stock buybacks and look at the cumulative cash returned to stockholders.

Augmented dividends = Dividends + Stock buybacks.

Unlike dividends, stock buybacks can spike in some years and may need to be averaged across a few years to arrive at more reasonable annualized numbers. KHC, unlike many other mature US companies, has chosen not to buy back stock any time in the last decade, leaving us with no augmentation to the dividend. If they had bought back stock, we would have added those buybacks (either the most recent year's number or an average over time) to the dividends.

With both dividends and augmented dividends, we are trusting managers at publicly traded firms to pay out to stockholders any excess cash left over after meeting operating and reinvestment needs. However, we do know that managers do not always follow this practice, as evidenced by the large cash balances that you see at most publicly traded firms. To estimate what managers could have returned to equity investors, we develop a measure of potential dividends that we term the *free cash flow to equity*.

Intuitively, the free cash flow to equity measures the cash left over after taxes, reinvestment needs, and debt cash flows have been met. Its measurement is laid out in Table 3.2.

For simplicity, we will first subtract depreciation from capital expenditures; the resulting *net capital expenditure* represents investment in long-term assets. Adding the net capital expenditures to the *change in non-cash working capital* yields the *total reinvestment*. This reinvestment reduces cash flow to equity investors, but it provides a payoff in terms of future growth. For KHC, the potential dividend, or free cash flow to equity (FCFE), can be computed as follows for 2020 to 2022, in Table 3.3.

To obtain these numbers, I drew on KHC's statement of cash flows and made a few computational assumptions. I included the cash acquisitions, net of divestments, that are shown in the statement in my capital expenditures and the commercial paper issued and repaid during 2020 and 2022 in both my debt issued and repaid. Finally, the change in non-cash working capital also includes the cash flow effects of deferred taxes.

Table 3.2 From Net Income to Potential Dividend (or Free Cash Flow to Equity)

	Measure	Explanation
	Net income	Earnings to equity
		investors, after
		taxes and interest
		expenses
+	Depreciation	Accounting expense
		(reduces earnings)
		but not a cash
		expense
_	Capital	Not an accounting
	expenditures	expense but still a
		cash outflow
_	Change in non-cas	sh Increases in
	working capital	inventory and
		accounts receivable

		reduce cash flows
		and increases in
		accounts payable
		increase cash flows.
		If working capital
		increases, cash flow
		decreases.
_	(Principal repaid –	Principal
	New debt issues)	repayments are cash
		outflows, but new
		debt generates cash
		inflows. The net
		change affects cash
		flows to equity.
=	Potential dividend,	This is the cash left
	or FCFE	over after all needs
		are met. If it is
		positive, it
		represents a
		potential dividend.
		If it is negative, it is
		a cash shortfall,
		which must be
		covered with new
		equity infusions.

Table 3.3 FCFE at Kraft Heinz from 2020 to 2022

	20 2 02	:0	
Net Income	\$2,368.00	\$1,024.00	\$361.00
+	\$933.00	\$910.00	\$969.00
Depreciation			
& amortization			
+ Goodwill	\$913.00	\$1,634.00	\$3,399.00
impairment			
– Capital	\$1,309.00	-\$4,035.00	\$596.00
expenditures			
- Change in	\$1,761.00	\$636.00	-\$115.00

non-cash WC			
FCFE before	\$1,144.00	\$6,967.00	\$4,248.00
Debt cash			
flows			
+ Debt	\$228.00	\$0.00	\$7,500.00
raised			
– Debt	\$1,683.00	\$8,161.00	\$10,655.00
repaid			
FCFE	-\$311.00	-\$1,194.00	\$1,093.00

KHC reinvested relatively little in net capital expenditures in 2022, but it had a substantial investment (\$1,761 million) in non-cash working capital and deferred taxes. The working capital line item, though, is volatile, going from a small decrease in working capital in 2020 to an increase in 2021 and an even larger jump in 2022. After incorporating the cash flows to and from debt, KHC a FCFE of – \$311 million in 2022 and a FCFE of – \$1,194 million in 2021, though that followed a year of positive FCFE that exceeded a billion. A more conservative version of cash flows to equity, which Warren Buffett calls "owners' earnings," ignores the net cash flow from debt. For KHC, the FCFE before debt cash flows has been positive each year, with the big jump in 2021 coming from divestitures of assets.

The cash flow to the firm is the cash left over after taxes and after all reinvestment needs have been met but before interest and principal payments on debt. To get to cash flow to the firm, you start with operating earnings, instead of net income, and subtract out the taxes you would have paid if the entire operating income were taxable and then subtract reinvestment, with the latter defined exactly the same way it was to get to FCFF:

Using our earlier definition of reinvestment, we can also write the FCFF as follows:

Reinvestment rate Capital expenditure – Depreciation + Change in non-cash working capital After-tax operating income

Free cash flow to the firm = (After-tax operating income) \times (1-Reinvestment rate).

The reinvestment rate can exceed 100 percent if the firm is reinvesting more than it is earning, or it can also be less than zero for firms that are divesting assets and shrinking capital. Both FCFE and FCFF are after taxes and reinvestment, and both can be negative, either because a firm has negative earnings or because it has reinvestment needs that exceed income. The key difference is that the FCFE is after debt cash flows and the FCFF is before. KHC's FCFF between 2020 and 2022 can be computed in Table 3.4.

Table 3.4 FCFF at Kraft Heinz from 2020 to 2022

	202020		
Operating	\$3,634.00	\$3,460.00	\$2,128.00
income			
Effective tax	20.20%	40.10%	65.00%
rate (t)			
Operating	\$2,899.93	\$2,072.54	\$744.80
income \times (1 –			
t)			
+	\$933.00	\$910.00	\$969.00
Depreciation			
& amortization			
+ Goodwill	\$913.00	\$1,634.00	\$3,399.00
impairment			
- Capital	\$1,309.00	-\$4,035.00	\$596.00
expenditures			
- Change in	\$1,761.00	\$636.00	-\$115.00
non-cash WC			
Free cash flow	\$1,675.93	\$8,015.54	\$4,631.80
to firm			

This represents free cash flows from operations for KHC between

2020 and 2022. Note that the tax is computed as if the entire operating income was taxed (which it is not) and reflects an estimate of how much taxes would have been due if the company had no debt. That is why this cash flow (FCFF) is referred to as an unlevered cash flow.

Table 3.5 Reinvestment at Kraft Heinz from 2020 to 2022

		2020		2020-2022
EBIT × (1	\$2,899.93	\$2,072.54	\$744.80	\$5,717.27
t)				
FCFF	\$1,675.93	\$8,015.54	\$4,631.80	\$14,323.27
Reinvestmen	t \$1,224.00	-\$5,943.00	-\$3,887.00	-\$8,606.00
Reinvestmen	t 42.21%	-286.75%	-521.89%	-150.53%
rate				

With both FCFE and FCFF, note the volatility in cash flows from year to year, even if earnings are stable, as reinvestment ebbs and flows. In fact, looking at the cumulative values for FCFF and after-tax operating income for KHC over the 2020–2022 period allows us to estimate the amount reinvested by the firm over the period in Table 3.5.

While KHC reinvested 42.21% of its after-tax operating income in 2022, it had negative reinvestment in 2020 and 2021; it shrunk as a business, divesting far more in assets than it was adding.

Risk

Cash flows that are riskier should be assessed a lower value than more stable cash flows. In conventional discounted cash flow valuation models, we use higher discount rates on riskier cash flows and lower discount rates on safer cash flows. The definition of risk will depend on whether you are valuing the business or just the equity. When valuing the business, you look at the risk in a firm's operations. When valuing equity, you look at the risk in the equity investment in this business, which is partly determined by the risk of the business the firm is in and partly by its choice on how much debt to use to fund that business. The equity in a safe business can become risky if the firm uses enough debt to fund that

business. In discount rate terms, the risk in the equity in a business is measured with the cost of equity, whereas the risk in the business is captured in the cost of capital. The latter will be a weighted average of the cost of equity and the cost of debt, with the weights reflecting the proportional use of each source of funding.

There are three inputs needed to estimate a cost of equity: a risk-free rate and a price for risk (equity risk premium) to use across all investments, as well as a measure of relative risk (beta) in individual investments.

- *Risk-free rate*: Since only entities that cannot default can issue risk-free securities, we generally use 10- or 30-year government bonds rates as risk-free rates, implicitly assuming that governments don't default.
- Equity risk premium (ERP): This is the premium investors demand on an annual basis for investing in stocks instead of a risk-free investment, and it should be a function of how much risk they perceive in stocks and how concerned they are about that risk. To estimate this number, analysts often look at the past; between 1928 and 2022, for instance, stocks generated 5.06 percent more, on an annual basis, than treasury bonds. An alternative is to back out a forward-looking premium (called an implied equity risk premium) from current stock price levels and expected future cash flows. In July 2023, the implied equity risk premium in the United States was approximately 5 percent. While the numbers were similar at the time of this assessment, the two approaches can yield different values, and we prefer the implied equity risk premium because it is updated and dynamic. The equity risk premiums in other countries can be estimated using the US premium as a base, set to the US premium if the country is mature and to higher values if the country is riskier. A company's ERP should reflect where it does business, not where it is incorporated.
- Relative risk or beta: To estimate the beta, we generally look at how much a stock has moved in the past, relative to the market: in statistical terms, it is the slope of a regression of returns on the stock (say KHC) against a market index

(such as the S&P 500). As a consequence, the beta estimates that we obtain will always be backward looking (since they are derived from past data) and noisy (since they are estimated with error). One solution is to replace the regression beta with a sector-average beta if the firm operates in only one business, or a weighted average of many sector betas if the firm operates in many businesses. The sector beta is more precise than an individual regression beta because averaging across many betas results in averaging out your mistakes.

In July 2023, the risk-free rate was set to the 10-year Treasury bond rate of 3.80 percent, the equity risk premium (ERP) was 5.67 percent, reflecting KHC's revenue weighted geographic exposure, and the beta for KHC was estimated by looking at the business it operated in, which is food processing, as shown in Table 3.6.

Table 3.6 Estimating a Beta for KHC

Business	Estimated	Proportion of Sector beta
	value	firm
Food	18000	0.60%
processing		
KHC as a firm	18000	0.6194%

Note that if KHC had been a multi-business company, we would have estimated a weighted average of the betas of the businesses it operated in, with the weights based on the values of these businesses. Adjusting this beta for the debt in KHC, since financial leverage magnifies business risk, results in a beta of 0.92 for the equity in KHC:

Levered beta = Unlevered beta
$$(1 + (1 - \text{Tax rate})$$

 $(\text{Debt/Market equity}))$
= $0.69(1 + (1 - 0.25)(19,759/44,756)) = 0.92$

The resulting cost of equity is 9.00 percent:

Cost of equity = Risk-free rate + Beta × ERP
=
$$3.80\% + 0.92 \times 5.67\% = 9.00\%$$

While equity investors receive residual cash flows and bear the

risk in those cash flows, lenders to the firm face the risk that they will not receive their promised payments—interest expenses and principal repayments. It is to cover this default risk that lenders add a default spread to the riskless rate when they lend money to firms; the greater the perceived risk of default, the greater the default spread and the cost of debt. To estimate this default spread, you can use a bond rating for the company, if one exists, from an established ratings agency such as S&P or Moody's. If there is no published bond rating, you can estimate a synthetic rating for the firm, based on its ratio of operating income to interest expenses (interest coverage ratio); higher interest coverage ratios will yield higher ratings and lower interest coverage ratios. Once you have a bond rating, you can estimate a default spread by looking at publicly traded bonds with that rating. In July 2023, S&P gave KHC a BBB rating, and the default spread for BBB-rated bonds at the time was 1.89%, which when added to the risk-free rate of 3.80% yields a pretax cost of debt of 5.69%. Incidentally, if KHC had not had a rating, we could have computed an interest coverage ratio for the firm:

$$Interest\ coverage\ ratio = \frac{Operating\ income}{Interest\ expense} = \frac{\$3634}{\$921} = 3.95$$

With this coverage ratio, we would have obtained a synthetic rating of A-, translating into a default spread of 1.54% and a pretax cost of debt of 5.34%, in July 2023.

The final input needed to estimate the cost of debt is the tax rate. Since interest expenses save you taxes at the margin (on your last dollar of income), the tax rate that is relevant for this calculation is the tax rate that applies to those last dollars, or the *marginal tax rate*. In the United States, where the federal corporate tax rate is 21 percent and state and local taxes add to this, the marginal tax rate for corporations in 2023 was close to 25 percent. Bringing together the risk-free rate (3.80 percent), the default spread (1.89 percent), and the marginal tax rate of 25 percent, we estimate an after-tax cost of debt of 4.27 percent for KHC:

After-tax cost of debt = (Risk-free rate + Default spread)

$$(1 - Marginal tax rate)$$

= $(3.80\% + 1.89\%)(1 - 0.25) = 4.27\%$

Once you have estimated the costs of debt and equity, you estimate the weights for each, based on market values (rather than book value). For publicly traded firms, multiplying the share price by the number of shares outstanding will yield market value of equity. Estimating the market value of debt is usually a more difficult exercise since most firms have some debt that is not traded, and so many practitioners fall back on using book value of debt. Using KHC again as our illustrative example, the market values of equity (\$44,756 million) and debt (\$19,476 million), and our earlier estimates of cost of equity (9.00 percent) and after-tax cost of debt (4.27 percent), result in a cost of capital for the firm of 7.56 percent.

When valuing firms, we have a follow-up judgment to make in terms of whether these weights will change or remain stable. If we assume that they will change, we must specify both what the target mix for the firm will be and how soon the change will occur. In addition, it is worth gaining perspective of where your firm's cost of capital falls, relative to other firms in the market, and in the case of KHC, the estimated cost of capital would put them toward the bottom quartile of US firms, which makes sense, since they are in a business with relatively little exposure to macroeconomic risks.

Growth Rates

When confronted with the task of estimating growth, it is not surprising that analysts turn to the past, using growth in revenues or earnings in the recent past as a predictor of growth in the future. However, the historical growth rates for the same company can vary, depending on computational choices: how far back to go, which measure of earnings (net income, earnings per share, operating income) to use, and how to compute the average (arithmetic or geometric). With KHC, for instance, the historical growth rates are very low (1.7% in the most recent year and 1%–2% a year for the last decade depending on the earnings measure

(earnings per share, net income, or operating income) used. Worse still, studies indicate that the relationship between past and future growth is a very weak one, with growth dropping off significantly as companies grow and revealing significant volatility from period to period.

Alternatively, you can draw on "experts" who know the firm better than you do—equity research analysts who have tracked the firm for years or the managers in the firm—and use their estimates of growth. On the plus side, these forecasters should have access to better information than most investors do. On the minus side, neither managers nor equity research analysts can be objective about the future; managers are likely to overestimate their capacity to generate growth, and analysts have their own biases. Studies indicate that analyst and management estimates of future growth, especially for the long term, seem just as flawed as historical growth rates.

If historical growth and analyst estimates are of little value, what is the solution? Ultimately, for a firm to grow, it has to either manage its existing investments better (efficiency growth) or make new investments (new investment growth). In the special case where a company's margins are stable and there is no efficiency-driven growth, you should look at how much of its earnings a firm is reinvesting back in the business and the return on these investments. While reinvestment and return on investment are generic terms, the way in which we define them will depend on whether we are looking at equity earnings or operating income. With equity earnings, we measure reinvestment as the portion of net income not paid out as dividends (retention ratio) and use the return on equity to measure the quality of investment. With operating income, we measure reinvestment as the reinvestment rate and use the return on capital to measure investment quality. In Table 3.7, we look at how to estimate the sustainable growth for a firm, with stable margins, in operating income and net income.

For many firms, the assumption that margins will stay stable is not a defensible one. For those firms, you have to start with revenue forecasts, estimate the (changing) operating margins over time, and tie reinvestment to your revenue changes. The ratio that works best for this tie-in is a sales-to-invested-capital ratio, measuring the dollars of revenues you generate, per dollar of capital invested.

Table 3.7 Estimating Sustainable Growth

Growth in earnings	How much are you reinvesting?	How well are you reinvesting?	
Operating = income	Reinvestment rate	Return on capital (ROIC)	
Net income =	Retention × ratio	Return on equity (ROE)	

For KHC, the reinvestment rate has been negative in the last three years, revenue growth has been anemic, and margins are still recovering from the COVID effects of 2020. To estimate the free cash flows to the firm, we assume continued slow growth in revenues (2% for the next five years, dropping down to 1% in stable growth) and improvement in operating margins (from 13.72% in 2022 to 15.00% in 2027). To estimate reinvestment, we assume that KHC's sales-to-capital ratio will converge on the global average of 1.49 for the food processing business. The resulting free cashflows to the firm are in Table 3.8.

Note that the tax rate starts at the most recent year's level (20.2%) but converges over time to the US marginal tax rate of 25%. The reinvestment in each year is computed by looking at the change in revenue over the next year, divided by the sales-to-capital ratio. Thus, to get reinvestment in year 1, we take the change in revenues from year 1 to year 2:

Reinvestment in year
$$1 = (Revenue 2 - Revenue 1)/Sales to capital$$

= $(\$27,555 - \$27,015)/1.49 = \$363$ million

In businesses with a long lag between reinvestment and sales, we can move this window forward, computing the reinvestment based on revenue change between years 3 and 4, for instance.

Table 3.8 Expected Free Cash Flow to Firm for KHC

RevenuRev	en æ perat ing I	Г Тах	EBIT	Reinvestment
Growth	Margin	Rate	× (1 –	'
			t)	

Daga		\$26.49	_				
Base		\$26,48	3				
year							
1	2.00%	\$27,01	513.72%	\$3,707	20.20%	\$2,958	\$363
2	2.00%	\$27,55	514.23%	\$3,922	20.20%	\$3,130	\$370
3	2.00%	\$28,10	614.49%	\$4,072	20.20%	\$3,250	\$377
4	2.00%	\$28,66	814.74%	\$4,227	20.20%	\$3,373	\$385
5	2.00%	\$29,24	215.00%	\$4,386	20.20%	\$3,500	\$393
6	1.80%	\$29,76	815.00%	\$4,474	21.16%	\$3,527	\$400
7	1.60%	\$30,24	415.00%	\$4,563	22.12%	\$3,554	\$408
8	1.40%	\$30,66	815.00%	\$4,655	23.08%	\$3,580	\$417
9	1.20%	\$31,03	615.00%	\$4,748	24.04%	\$3,606	\$425
10	1.00%	\$31,34	615.00%	\$4,843	25.00%	\$3,632	\$433
Termir	all.00%	\$31,65	915.00%	\$4,940	25.00%	\$3,705	\$741
year							

Terminal Value

Publicly traded firms can, at least in theory, last forever. Given that we cannot estimate cash flows forever, we generally impose closure in valuation models by stopping our estimation of cash flows sometime in the future and then computing a terminal value that reflects estimated value at that point. The two legitimate ways of estimating terminal value are to estimate a liquidation value for the assets of the firm, assuming that the assets are sold in the terminal year, or to estimate a going-concern value, assuming that the firm's operations continue.

If we assume that the business will be ended in the terminal year and that its assets will be liquidated at that time, we can estimate the proceeds from the liquidation, using a combination of market-based numbers (for assets such as real estate that have ready markets) and estimates. For firms that have finite lives and marketable assets, this represents a conservative way of estimating terminal value.

If we treat the firm as a going concern at the end of the estimation period, we can estimate the value of that concern by assuming that cash flows will grow at a constant rate forever afterward. This perpetual growth model draws on a simple present value equation

to arrive at terminal value:

Terminal value in year
$$n = \frac{\text{Cash flow in year } n + 1}{\text{Discount rate} - \text{Perpetual growth rate}}$$

The definitions of cash flow and growth rate have to be consistent with whether we are valuing dividends, cash flows to equity, or cash flows to the firm; the discount rate will be the cost of equity for the first two and the cost of capital for the last. Since the terminal value equation is sensitive to small changes and thus ripe for abuse, there are three key constraints that should be imposed on its estimation: First, no firm can grow forever at a rate higher than the growth rate of the economy in which it operates. In fact, a simple rule of thumb on the stable growth rate is that it should not exceed the risk-free rate used in the valuation; the risk-free rate is composed of expected inflation and a real interest rate, which should equate to the nominal growth rate of the economy in the long term. Second, as firms move from high growth to stable growth, we need to give them the characteristics of stable growth firms; as a general rule, their risk levels should move toward the market (beta of one) or toward industry averages, and debt ratios should increase to industry norms. Third, a stable growth firm should reinvest enough to sustain the assumed growth rate. Given the relationship between growth, reinvestment rate, and returns that we established in the section on expected growth rates, we can estimate this reinvestment rate:

$$Reinvestment \ Rate = \frac{ or \ net \ in \ operating}{Return \ on \ capital \ or \ equity}$$

Thus, the effect on the terminal value of increasing the growth rate will be partially or completely offset by the loss in cash flows because of the higher reinvestment rate. Whether value increases or decreases as the stable growth rate increases will entirely depend on what you assume about the return on investment. If the return on capital (equity) is higher than the cost of capital (equity) in the stable growth period, increasing the stable growth rate will increase value; the difference between the two is termed an excess return. If the return on capital is equal to the stable period cost of capital, increasing the stable growth rate will have no

effect on value. The key assumption in the terminal value computation is not what growth rate you use in the valuation but what excess returns accompany that growth rate. There are some analysts who believe that zero excess return is the only sustainable assumption for stable growth since no firm can maintain competitive advantages forever. In practice, though, firms with strong and sustainable competitive advantages can maintain excess returns, though at fairly modest levels, for very long time periods.

Using KHC, we assumed that the firm would be in stable growth after the fifth year and grow 1% a year forever (set well below the risk-free rate, as we expect the company's products and consumers to age). As the growth declines after year 10, we adjust the cost of capital slightly, moving it from 7.56% to 7.50%. That adjustment is small, since KHC is already a mature firm, but would be much larger for a higher growth firm. The reinvestment rate in stable growth is changed to reflect the assumption that KHC will be able to earn a return on capital of 10%, higher than its cost of capital of 7.50%, because of enduring brand name pricing power.

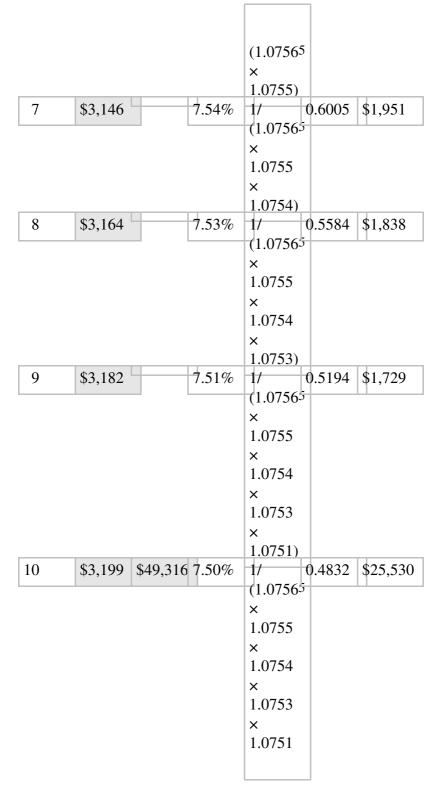
Reinvestment rate in stable growth =
$$\frac{1\%}{10\%}$$
 = 10%.

The resulting terminal value at the end of year 10 is \$49,316 million.

$$\frac{(A \text{fter-tax operating income in year 6}) \times (1 - \text{Reinvestment rate})}{\text{Cost of capital} - \text{Expected growth rate}} \\ = \frac{3526 (1.01) (1 - 0.10)}{0.075 - 0.01} = \$49,316 \, \text{million}.$$

Table 3.9 Value of Operating Assets at KHC

Year	FCFF	Termin		Discour		ı P V
		value	capital	comput	afaiot or_	
1	\$2,595		7.56%	1/1.0756	0.9297	\$2,413
2	\$2,760		7.56%	1/1.0756	0.8643	\$2,385
3	\$2,872		7.56%	1/1.0756	0 .8035	\$2,308
4	\$2,988		7.56%	1/1.0756	⊕.7470	\$2,232
5	\$3,108		7.56%	1/1.0756	0.6945	\$2,186
6	\$3,127		7.55%	1/	0.6457	\$1,067



×1.075)

Value of \$44,538 Operating Assets =

Discounting this terminal value and the cash flows from Table 3.3 at the cost of capital yields a value of \$44,538 million for operating assets. Since the cost of capital is changing after year 5, we should account for that effect when computing present value. Table 3.9 summarizes the present value computations.

In this case, the effect of computing a cumulative cost of capital rather than discounting back at that year's cost of capital is minor, but it will become significant for companies where costs of capital change significantly over time.

Tying Up Loose Ends

Discounting cash flows at the risk-adjusted rates gives an estimate of value, but how do you get to value per share? If you discounted dividends or free cash flows to equity on a per-share basis at the cost of equity, you have your estimate of value per share. If you discounted cash flows to the firm, you have four adjustments to make to get to value per share:

- 1. Add back the cash balance of the firm: Since free cash flow to the firm is based on operating income, you have not considered the income from cash or incorporated it into value.
- 2. Adjust for cross holdings: Add back the values of small (minority) holdings that you have in other companies; the income from these holdings was not included in your cash flow. If you have a majority stake in another company, the requirement that you consolidate and report 100 percent of the subsidiary's operating income as your own will create minority interests, the accounting estimate of the portion of the subsidiary that does not belong to you. You must subtract out the estimated market value of the minority interest from your consolidated firm value.
- 3. Subtract debt and other potential liabilities: Since the

value of equity is net of debt, you should subtract out all interest-bearing debt, short and long term. If you have underfunded pension or health care obligations or ongoing lawsuits that may generate large liabilities, you have to estimate a value and subtract it out.

- 4. *Deal with stock-based compensation residue:* The expenses associated with stock-based compensation should be treated like any other operating expense and reduce operating income. When the stock-based compensation takes the form of options, analysts often use shortcuts (such as adjusting the number of shares for dilution) to deal with these options. The right approach is to value the options (using option pricing models) and reduce the value of equity by the option value.
- 5. Share count: To get to value per share, you should divide by the actual share count today, including any restricted stock that may have been issued as part of management compensation. You should not adjust this count for expected future share issuances, since that should be already incorporated in the intrinsic value; the negative cash flows that give rise to these stock issuances reduce the value you attach to the firm today.

With KHC, we add the cash balance to, and subtract out the debt outstanding and the estimated value of management options outstanding from, the value of the operating assets to generate a value of equity for KHC of \$27,376 million.

Value of KHC equity = Value of operating assets + Cash – Debt – Management options =
$$$44,538 + $1,040 - $20,070 - $63 = $25,445$$
 million

If you divide by 1,235 million—the number of shares outstanding at the time—the result is a value of \$20.60 per share.

Value per share = 25,445/1,235 = \$20.60 per share

What Do These Models Tell Us?

What if the intrinsic value that you derive, from your estimates of cash flows and risk, is very different from the market price? There are three possible explanations. One is that you have made erroneous or unrealistic assumptions about a company's future growth potential or riskiness. A second and related explanation is that you have made incorrect assessments of risk premiums for the entire market. A third is that the market price is wrong and that you are right in your value assessment. Even in the last scenario, there is no guarantee that you can make money from your valuations. For that to occur, markets have to correct their mistakes, and that may not happen in the near future. In fact, you can buy stocks that you believe are undervalued and find them become more undervalued over time. That is why a long time horizon is almost a prerequisite for using intrinsic valuation models. Giving the market more time (say three to five years) to fix its mistakes provides better odds than hoping that it will happen in the next quarter or the next six months.

The intrinsic value per share of \$20.60 that we derived for KHC in July 2023 was much lower than the stock price of \$36 at the time. The stock looks overvalued, but that judgment is a function of the low growth rates that we forecast for the company. It is conceivable that younger consumers may rediscover a taste for ketchup and liquefied cheese that will allow the company to move back to a higher growth path and a higher value. In fact, we can get a sense of what KHC must deliver to be able to justify the current market price by varying revenue growth and operating margin assumptions in Table 3.10.

The shaded cells in the table indicate values that exceed the market price of \$36, and as can be seen, KHC would need to deliver a combination of much higher revenue growth and operating margins than we have assumed in our base case valuation.

Table 3.10 Revenue Growth, Margins, and Value per Share for KHC

	T4
	Target

		Operat Margin (in year 5)	ı			
			18%			
Revenu	ie 0%	\$12.15	\$16.06	\$19.96	\$23.87	\$27.77
Growth	1					
Rate						
(Years						
1–5)						
2%	\$13.97	\$18.39	\$22.82	\$27.24	\$31.66	
4%	\$15.95	\$20.96	\$25.96	\$30.97	\$35.97	
6%	\$18.12	\$23.78	\$29.43	\$35.09	\$40.74	
8%	\$20.51	\$26.88	\$33.26	\$39.64	\$46.01	
10%		\$30.30	\$37.48	\$44.66	\$51.84	

It's All in the Intrinsic Value!

The intrinsic value of a company reflects its fundamentals. Estimates of cash flows, growth, and risk are all embedded in that value, and it should have baked into it all of the other qualitative factors that are often linked to high value, such as a great management team, superior technology, and a long-standing brand name. There is no need for garnishing in a well-done intrinsic valuation.

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Chapter Four



It's All Relative!: Determining Relative Value

IF CISCO (CSCO) IS TRADING AT 17 TIMES EARNINGS, Apple (AAPL) has a PE ratio of 21, and Microsoft (MSFT) is priced at 11 times earnings, which stock offers the best deal? Is Cisco cheaper than Apple? Is Microsoft a bargain compared to both Apple and Cisco? Are they even similar companies? Relative valuation is all about comparing how the market prices different companies, with the intent of finding bargains.

In relative valuation, you price an asset based on how similar assets are priced in the market. A prospective house buyer decides how much to pay for a house by looking at the prices paid for similar houses in the neighborhood. In the same vein, a potential investor in Twitter's IPO (initial public offering) in 2013 could have estimated its value by looking at the market pricing of other social media companies. The three essential steps in relative valuation are:

- 1. Find comparable assets that are priced by the market;
- 2. Scale the market prices to a common variable to generate standardized prices that are comparable across assets; and
- 3. Adjust for differences across assets when comparing their standardized values. A newer house with more updated amenities should be priced higher than a similar-sized older house that needs renovation, and a higher growth company should trade at a higher price than a lower growth company in the same sector.

Pricing can be done with less information and much more quickly than intrinsic valuations, and it is more likely to reflect the market mood of the moment. Not surprisingly, most of what passes for valuation in investment banking and portfolio management is really pricing.

Standardized Values and Multiples

Comparing assets that are not exactly similar can be a challenge. If you were to compare the prices of two buildings of different sizes in the same location, the smaller building will look cheaper unless you control for the size difference by computing the price per square foot. When comparing publicly traded stocks across companies, the price per share of a stock is a function both of the value of the equity in a company and the number of shares outstanding in the firm. To compare the pricing of "similar" firms in the market, the market value of a company can be standardized relative to how much it earns, its accounting book value, to revenue generated, or to a measure specific to a firm or sector (number of customers, subscribers, units, and so on). When estimating market value, you have three choices:

- 1. *Market value of equity:* The price per share or market capitalization.
- 2. *Market value of firm:* The sum of the market values of both debt and equity.
- 3. *Market value of operating assets or enterprise value:* The sums of the market values of debt and equity but with cash netted out of the value.

When measuring earnings and book value, you can again measure them from the perspective only of equity investors or of both debt and equity (firm). Thus, earnings per share and net income are earnings to equity, whereas operating income measures earnings to the firm. The shareholders' equity on a balance sheet is book value of equity; the book value of the entire business includes debt; and the book value of invested capital is that book value, net of cash. To provide a few illustrations: you can divide the market value of

equity by the net income in order to estimate the PE ratio (measuring how much equity investors are paying per dollar of earnings) or divide enterprise value by EBITDA (earnings before interest, taxes, depreciation, and amortization) to get a sense of the market value of operating assets relative to operating cash flow. The central reason for standardizing, though, does not change. We want to compare these numbers across companies.

In making those comparisons, we face two more challenges. The first is in determining what constitutes a comparable firm, with the simplest version focusing on firms in the "same" industry grouping or business and the more complex versions screening for companies of similar size, growth, and risk. The second is in controlling for differences that persist across these comparable firms on growth, risk, and cash flows, with the intent of explaining whether the company you are pricing is under- or overpriced relative to comparable firms. Figure 4.1 summarizes the pricing process.

Four Keys to Using Multiples

Multiples are easy to use and easy to misuse. There are four basic steps to using multiples wisely and detecting misuse in the hands of others, starting with making sure that they are defined consistently, and then moving on to looking at their distributional characteristics and the variables that determine their values, and concluding with using them in comparisons across firms.

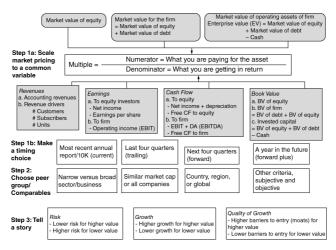


Figure 4.1 The Pricing Process

Definitional Tests

Even the simplest multiples are defined and computed differently by different analysts. A PE ratio for a company can be computed using earnings from the last fiscal year (current PE), the last four quarters (trailing PE), or the next four quarters (forward), yielding very different estimates. It can also vary depending on whether you use diluted or primary earnings. The first test to run on a multiple is to examine whether the numerator and denominator are defined consistently. If the numerator is an equity value, then the denominator should be an equity value as well. If the numerator is a firm value, then the denominator should be a firm value as well. To illustrate, the PE ratio is a consistently defined multiple since the numerator is the price per share (which is an equity value) and the denominator is earnings per share (which is also an equity value). So is the enterprise value to EBITDA multiple since the numerator and denominator are both measures of operating assets; the enterprise value measures the market value of the operating assets of a company, and the EBITDA is the cash flow generated by the operating assets. In contrast, the price-to-sales ratio and price to EBITDA are not consistently defined since they divide the market value of equity by an operating measure. Using these

multiples will lead you to finding any firm with a significant debt burden to be cheap.

For comparisons across companies, the multiple has to be defined uniformly across all of the firms in the group. Thus, if the trailing PE is used for one firm, it must be used for all of the others as well, and the trailing earnings per share has to be computed the same way for all firms in the sample. With both earnings and book value measures, differences in accounting standards can result in very different earnings and book value numbers for similar firms. Even with the same accounting standards governing companies, there can be differences in firms that arise because of discretionary accounting choices.

Descriptive Tests

When using multiples to value companies, we generally lack a sense of what constitutes a high or a low value with that multiple. To get this perspective, start with the summary statistics—the average and standard deviation for that multiple. Table 4.1 summarizes key statistics for four widely used multiples in January 2023.

Table 4.1 Summary Statistics on Multiples—Across US Stocks in January 2023

	Current PE	Price to Book	EV/ EBITDA	EV/Sales
		Equity		
Mean	109.25	5 12.40	323.3	89.04
Standard	34.10	2.18	82.2	18.91
error				
Median	13.92	2 1.59	13.30	2.70
Skewness	37.69	26.22	34.25	31.13
Maximum	86,400.00	5423.08	3 200,504.2	7 57,792.67

If the averages, across US stocks, for these multiples look high, it is because the lowest value for any of these multiples is zero and the highest can be huge, and the distributions for these multiples are skewed toward the positive values, as evidenced by the

distribution of PE ratios of US companies in January 2023, as shown in Figure 4.2.

The key lesson from this distribution should be that using the average as a comparison measure can be dangerous with any multiple. It makes far more sense to focus on the median. The median PE ratio in January 2023 was about 13.92, well below the average PE of 109.25 reported in Table 4.1, and this is true for all multiples. A stock that trades at 18 times earnings in January 2023 is not cheap, even though it trades at less than the average. To prevent outliers from skewing numbers, data reporting services that compute and report average values for multiples either throw out outliers when computing the averages or constrain the multiples to be less than or equal to a fixed number. The consequence is that averages reported by two services will almost never match up because they deal with outliers differently.

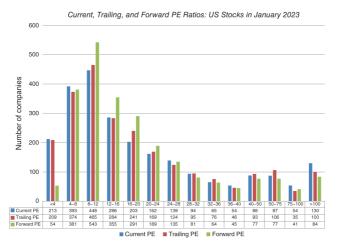


Figure 4.2 PE Ratio Distribution: US Stocks in January 2023

With every multiple, there are firms for which the multiple cannot be computed. Consider again the PE ratio. When the earnings per share are negative, the price/earnings ratio for a firm is not meaningful and is usually not reported. When looking at the average price/earnings ratio across a group of firms, the firms with

negative earnings will all drop out of the sample because the price/ earnings ratio cannot be computed. Why should this matter when the sample is large? The fact that the firms that are taken out of the sample are the firms losing money implies that the average PE ratio for the group will be biased upward because of the elimination of these firms. Generally, you should be skeptical about any multiple that results in a significant reduction in the number of firms being analyzed.

Table 4.2 PE Ratios across Time: 2004–2023

Year	Median	% with	Year	Median	% with
	PE	PE		PE	PE
2004		4520	DANKA/o		
2005		4510	6XPSWo		
2006		432	KXDIG9Vo		
2007		4500			
2008		490	BX INSS/o		
2009		4512	RXOVOVO		
2010		413	ROSTO		
2011		36	RV2V9 6/0		
2012		350	RXIDW/		
2013		48	529:3 /o		

Finally, multiples change over time for the entire market and for individual sectors. To provide a measure of how much multiples can change over time, Table 4.2 reports the median PE ratios for US stocks from 2004 to 2023.

A stock with a PE of 15 would have been cheap in 2008 but expensive in 2009. In the table, we note the percentage of firms in the overall sample for which we were able to compute PE ratios. Each year, we lose roughly half of all firms in the sample because they have negative earnings, and the percent of firms with PE ratios has declined in the last decade even as the median PE ratio has risen from 2008 lows.

Why do multiples change over time? Some of the change can be attributed to fundamentals. As interest rates and economic growth shift over time, the pricing of stocks will change to reflect these shifts; lower interest rates, for instance, played a key role in the

rise of earnings multiples through the post-2008 time period. Some of the change, though, comes from changes in market perception of risk. As investors become more risk averse, which tends to happen during recessions, multiples paid for stocks will decrease.

From a practical standpoint, what are the consequences? The first is that comparisons of multiples across time are fraught with danger. For instance, the common practice of branding a market to be under- or overvalued based on comparing the PE ratio today to historical PE ratios will lead to misleading judgments when interest rates are higher or lower than historical norms. The second is that relative valuations have short shelf lives. A stock may look cheap relative to comparable companies today, but that assessment can shift dramatically over the next few months. Finally, rules of thumb about what constitutes a low or a high PE ratio that stay constant in absolute terms will break down when the distribution of PE ratios changes over time.

Analytical Tests

You make just as many assumptions when you do a relative valuation as you do in a discounted cash flow valuation. The difference is that the assumptions in a relative valuation are implicit and unstated, whereas those in discounted cash flow valuation are explicit and stated. In the intrinsic valuation chapter, we observed that the value of a firm is a function of three variables —its capacity to generate cash flows, its expected growth in these cash flows, and the uncertainty associated with these cash flows. Every multiple, whether it is of earnings, revenues, or book value, is a function of the same three variables—risk, growth, and cash flow generating potential. Intuitively, firms with higher growth rates, less risk, and greater cash flow generating potential should trade at higher multiples than firms with lower growth, higher risk, and less cash flow potential. To look under the hood, so to speak, of equity and firm value multiples, we can go back to simple discounted cash flow models for equity and firm value and use them to derive the multiples.

In the simplest discounted cash flow model for equity, which is a stable growth dividend discount model, the value of equity is:

Value of equity =
$$\frac{\text{Expected dividends next year}}{\text{Cost of equity} - \text{Expected growth rate}}.$$

Dividing both sides of this equation by the net income, we obtain the discounted cash flow equation specifying the PE ratio for a stable growth firm.

$$\frac{\text{Value of equity}}{\text{Net income}} = \text{PE} = \frac{\text{Dividend payout ratio}}{\text{Cost of equity} - \text{Expected growth rate}},$$

where the payout ratio is the dividend divided by net income.

The key determinants of the PE ratio are the expected growth rate in earnings per share, the cost of equity, and the payout ratio. Other things remaining equal, we would expect higher growth, lower risk, and higher payout ratio firms to trade at higher multiples of earnings than firms without these characteristics. Dividing both sides of the equation by the book value of equity, we get the price/book value ratio for a stable growth firm,

$$\frac{\text{Value of equity}}{\text{BV of equity}} = \text{PBV} = \frac{\text{ROE} \times \text{Dividend payout ratio}}{\text{Cost of equity} - \text{Expected growth rate}},$$

where ROE is the return on equity (net income/book value of equity) and is the only variable in addition to the three that determine PE ratios (growth rate, cost of equity, and payout) that affects price-to-book equity. While all of these computations are based on a stable growth dividend discount model, the conclusions hold even when we look at companies with high growth potential and with other equity valuation models.

We can do a similar analysis to derive the firm value multiples. The value of a firm in stable growth can be written as:

$$Enterprise \ value = \frac{Expected \ FCFF \ next \ year}{Cost \ of \ capital - Expected \ growth \ rate}.$$

Since the free cash flow of the firm is the after-tax operating income netted against the net capital expenditures and working capital needs of the firm, this can be rewritten as follows:

$$Enterprise\ value = \frac{EBIT\ (1-Tax\ rate)\ (1-Reinvestment\ rate)}{Cost\ of\ capital-Expected\ growth\ rate}.$$

Dividing both sides of this equation by sales, and defining the after-tax operating margin as after-tax operating income divided by sales, yields the following:

$$\frac{\text{Enterprise value}}{\text{Sales}} = \frac{\text{(After-tax operating margin)}}{\text{(1- Reinvestment rate)}}$$

$$\frac{\text{Cost of capital - Expected growth rate}}{\text{Cost of capital - Expected growth rate}}.$$

Table 4.3 summarizes the multiples and the key variables that determine each multiple, with the sign of the relationship in brackets next to each variable: 1 indicates that an increase in this variable will increase the multiple, whereas indicates that an increase in this variable will decrease the multiple, holding all else constant.

Table 4.3 Fundamentals Determining Multiples

Multiple	Fundamental determinants
PE ratio	Expected growth(1), payout(
	介), risk(少)
Price-to-book-equity ratio	Expected growth(1), payout(
	♠, risk(♣), ROE(♠)
Price-to-sales ratio	Expected growth(1), payout(
	$\uparrow \uparrow$), risk($\downarrow \downarrow$), net margin($\uparrow \uparrow$)
EV to FCFF	Cost of capital(↓), growth
	rate(1)
EV to EBITDA	Expected growth(1),
	reinvestment rate($\mathbf{\Psi}$), risk($\mathbf{\Psi}$),
	$ROC(\mathbf{\hat{1}})$, tax rate($\mathbf{\Psi}$)
EV-to-capital ratio	Expected growth(1),
	reinvestment rate($\mathbf{\Psi}$), risk($\mathbf{\Psi}$),
	ROC(♠)
EV to sales	Expected growth(1),
	reinvestment rate(\bigcup), risk(\bigcup),
	operating margin(1)

Table 4.4 Valuation Mismatches

Tuble III Haranton Management				
Multiple	Companion	Mismatch		

	variable	indicator for undervalued company
PE ratio	Expected growth	Low PE ratio with
		high expected growth rate in earnings per share
P/BV ratio	ROE	Low P/BV ratio with high ROE
P/S ratio	Net margin	Low P/S ratio with high net profit
	14 .	margin
EV/EBITDA	Reinvestment rate	Low EV/EBITDA
		ratio with low reinvestment needs
EV/Capital	Return on capital	Low EV/Capital
		ratio with high return on capital
EV/Sales	After-tax operating	Low EV/Sales ratio
	margin	with high after-tax operating margin

Notwithstanding the fact that each multiple is determined by many variables, there is a single variable that dominates when it comes to explaining each multiple (and it is not the same variable for every multiple). This variable is called the *companion variable* and is key to finding undervalued stocks. In Table 4.4, the companion variables and mismatches are identified for six multiples.

Application Tests

Multiples tend to be used in conjunction with comparable firms to determine the value of a firm or its equity. A comparable firm is one with cash flows, growth potential, and risk similar to the firm being valued. Nowhere in this definition is there a component that relates to the industry or sector to which a firm belongs. Thus, a

telecommunications firm can be compared to a software firm if the two are identical in terms of cash flows, growth, and risk. In most analyses, however, analysts define comparable firms to be other firms in the firm's business or businesses. As an illustrative example, in 2009, if you were trying to value Todhunter International and Hansen Natural, two beverage companies, you would compare them to other beverage companies on pricing (PE ratios) and fundamentals (growth and risk).

If there are enough firms in the industry to allow for it, this list can be pruned further using other criteria; for instance, only firms of similar size may be considered. No matter how carefully we construct our list of comparable firms, we will end up with firms that are different from the firm we are valuing. There are three ways of controlling for these differences, and we will use the beverage sector to illustrate each one.

In the first, the analyst compares the multiple it trades at to the average computed; if it is significantly different, the analyst can make a subjective judgment about whether the firm's individual characteristics (growth, risk, or cash flows) may explain the difference. In Table 4.5, for instance, Todhunter trades at a PE of 8.94, much lower than other beverage companies, but it also has much lower expected growth. Hansen Natural also looks cheap, with a PE of 9.70, but its stock has been very volatile. If, in the judgment of the analyst, the difference in PE cannot be explained by fundamentals (low growth or high risk), the firm will be viewed as undervalued. The weakness in this approach is not that analysts are called upon to make subjective judgments but that the judgments are often based on little more than guesswork.

Table 4.5 Beverage Companies in the US in March 2009

Company Sta	n d Easpel e d dEsclaig fi	ing MitoEPS rices
name		
Andres Wines	238	59%
Ltd. "A"		
Anheuser-	22 4	981%
Busch		
Boston Beer	390	53%
"A"		
	-	

Brown-Forman	29050%	
'B'	11.50%	
Chalone Wine	22108%	
Group Ltd.	22,0000	
Coca-Cola	3\$450%	
Coca-Cola	2 D 558%	
Bottling	ZZZ ZEDEC	
Coca-Cola	237.90%	
Enterprises	23170	
Coors	29:60%	
(Adolph) "B"	213-3620	
Corby	2BC6B%	
Distilleries	Zilisative	
Ltd.		
Hansen	62900%	
Natural Corp.	42.49 00	
Molson Inc.	24 3 80 %	
Ltd. "A"	23.0030	
Mondavi	45690%	
(Robert) "A"	1300 //0	
PepsiCo, Inc.	3 9 25 6 %	
Todhunter Int'	258000476	
Whitman	44526%	
Corp.	725-21U7U	
Average	32280%	
Median	29258%	
Wiculan	AA1450 70	

In the second approach, we modify the multiple to take into account the most important variable determining it—the companion variable. To provide an illustration, analysts who compare PE ratios across companies with very different growth rates often divide the PE ratio by the expected growth rate in EPS to determine a growth-adjusted PE ratio, or the PEG ratio. Going back to Table 4.5, take a look at Todhunter and Hansen, relative to other beverage companies:

PEG ratio for Todhunter =
$$\frac{PE \text{ ratio for Todhunter}}{Todhunter's \text{ growth rate}}$$
$$= \frac{8.94}{3} = 2.98,$$

PEG ratio for Hansen =
$$\frac{PE \text{ ratio for Hansen}}{Hansen's \text{ growth rate}} = \frac{9.70}{17} = 0.57$$
,

PEG ratio for beverage sector =
$$\frac{\text{Average PE ratio}}{\text{Sector average growth rate}}$$

= $\frac{22.66}{12.60}$ = 1.80.

Hansen continues to look cheap, on a PEG ratio, relative to the sector, but Todhunter, with a PEG ratio of 2.98 (8.94/3), now looks expensive. There are two implicit assumptions that we make when using these modified multiples. The first is that these firms are all of equivalent risk, a problem for Hansen, which looks riskier than the other companies in the sector. The other is that growth and PE move proportionately; for example, when growth doubles, PE ratios double as well. If this assumption does not hold up and PE ratios do not increase proportionally to growth, companies with high growth rates will look cheap on a PEG ratio basis.

When there is more than one variable to adjust for, when comparing across companies, there are statistical techniques that offer promise. In a multiple regression, for instance, we attempt to explain a dependent variable (such as PE or EV/EBITDA) by using independent variables (such as growth and risk) that we believe influence the dependent variable. Regressions offer two advantages over the subjective approach. First, the output from the regression gives us a measure of how strong the relationship is between the multiple and the variable(s) being used. Second, unlike the modified multiple approach, where we were able to control for differences on only one variable, a regression can be extended to allow for more than one variable and even for crosseffects across these variables. Applying this technique to the beverage company data in Table 4.5, PE ratios were regressed against expected growth and risk (standard deviation in stock prices) as shown here:

$$PE = 20.80 - 63.87$$
 Standard deviation + 183.23 Expected growth (3.27) (2.83) (3.93)

$$R^2 = 51\%$$

The R-squared indicates that 51 percent of the differences across beverage companies in PE ratios is explained by differences in our measures of growth and risk. The t-statistics, in brackets below the coefficients, indicate that standard deviation and expected growth are statistically significant explainers of differences in PE ratios in the beverage sector in 2009. Finally, the regression itself can be used to get predicted PE ratios for the companies in the list. Thus, the predicted PE ratios for Todhunter and Hansen based on their expected growth and risk measures are as follows:

PE for Todhunter =
$$20.80 - 63.87(0.2574) + 183.23(0.03) = 9.86$$

PE for Hansen =
$$20.80 - 63.87(0.6245) + 183.23(0.17) = 12.06$$

These are risk- and growth-adjusted forecasts, and both companies look undervalued, albeit by less than our initial comparison would have suggested.

Asset-based Valuation/Pricing

There is a variant on pricing that is offered by some as an alternative approach to valuation, though we do not think it qualifies, and that is to value the assets owned by a company, before cumulating that value to arrive at its aggregate valuation. Thus, with a company that owns five real estate properties, you could value each of the properties and add them up to arrive at company value. With a publicly traded company, this may take the form of valuing each balance sheet asset and then aggregating these values or breaking the company down, by geography or business, and valuing the sum of the parts.

The reason that we do not treat this as a different valuation approach is because the value you attach to a balance sheet asset or a division of a company must come from either doing an intrinsic valuation of that asset or division or, as is more often the case,

pricing that asset or division by looking at what others are paying for similar assets (divisions). To estimate the intrinsic value of assets or divisions, you will need information at the asset or division level that will allow you to estimate cash flows, growth, and risk from that asset or division.

Intrinsic vs. Relative Value (Pricing)

The two approaches to valuation—intrinsic and relative valuation—will generally yield different estimates of value for the same firm at the same point in time. It is even possible for one approach to generate the result that the stock is undervalued while the other concludes that it is overvalued. In early 2000, for instance, a discounted cash flow valuation of Amazon.com suggested that it was significantly overvalued, whereas valuing relative to other Internet companies at the same time yielded the opposite conclusion. Furthermore, even within relative valuation, we can arrive at different estimates of value depending on which multiple we use and what firms we based the relative valuation on.

The differences in value between discounted cash flow valuation and relative valuation come from different views of market efficiency or inefficiency. In discounted cash flow valuation, we assume that markets make mistakes, that they correct these mistakes over time, and that these mistakes can often occur across entire sectors or even the entire market. In relative valuation, we assume that while markets make mistakes on individual stocks. they are correct on average. In other words, when we value a new software company relative to other small software companies, we are assuming that the market has priced these companies correctly, on average, even though it might have made mistakes in the pricing of each of them individually. Thus, a stock may be overvalued on a discounted cash flow basis but undervalued on a relative basis if the firms used for comparison in the relative valuation are all overpriced by the market. The reverse would occur if an entire sector or market were underpriced.

The question of whether intrinsic valuation or pricing is a better approach to putting a number on an asset really misses the point,

since which approach you use will be determined by your philosophy about investments. If you believe that every cash flow generating asset has an intrinsic value and that the market price will correct to that intrinsic value sooner or later, you are an investor and you should try to estimate intrinsic value. If, on the other hand, you feel that intrinsic value is an illusion, with no guarantee that the market will ever adjust to it, you are a trader, and your focus will be on *pricing* assets, rather than valuing them. Markets need both investors and traders, the former to search out information and look for market mistakes and the latter to provide liquidity.

Einstein Was Right

In relative valuation or pricing, we estimate the value of an asset by looking at how similar assets are priced. While the allure of multiples remains their simplicity, the key to using them wisely remains finding comparable firms and adjusting for differences between the firms on growth, risk, and cash flows. Einstein was right about relativity, but even he would have had a difficult time applying relative valuation in today's stock markets.

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Chapter Five



Stories and Numbers: Narrative, Value, and Price

AFTER READING THE LAST two chapters on value and price, you may have concluded that both valuation and pricing are driven by numbers alone, but you would be wrong. In this chapter, we will argue that there is a story behind the numbers in the valuation and pricing of a company and that the key to valuing companies well is being able to craft plausible business stories and connecting these stories to the numbers you use in your valuation. In this chapter, we will begin by explaining how valuations connect stories to numbers and then describing the process of telling a business story, checking that story for reasonableness, and converting that story into valuation inputs and value.

Valuation as a Bridge

A good valuation is a bridge between stories and numbers, connecting a story about a business to inputs into a valuation, and by extension, to value. That process is encapsulated in Figure 5.1.

Put simply, a compilation of numbers in a spreadsheet or a model will give you a financial model, not a valuation, and a story about the prospects for a business, no matter how soaring and compelling, may just be a fairytale. For a valuation to be rooted in reality, every number in your valuation, measuring growth, risk, or profitability, has to have a story that explains it, and every story that you tell about your company, from brand name to

management quality, has to have a number that backs it up.

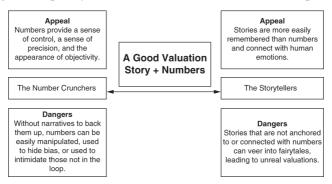


Figure 5.1 Valuation as a Bridge

Viewing valuation as a bridge between stories and numbers also brings into focus what you need to bring into the process to be able to value companies. For your valuations to make sense and become the basis for your actions, you must be either a disciplined storyteller or an imaginative number cruncher. If your strength is working with numbers, your task, if you want to value companies, should be getting more comfortable working with qualitative factors and ultimately bringing them into your numbers. If you are more drawn to storytelling, you must work on getting comfortable enough with numbers so that you can convert your stories into valuation inputs.

From Story to Numbers: The Process

In this section, we will lay out the sequence that we use to convert stories to numbers, in a valuation. Note, though, that this sequence is not set in stone and that you could find a variant that works for you better, with the end game being a melding of narrative with numbers.

Step 1: Construct a Business Story

The first step is coming up with a valuation story that you believe best fits the company you are valuing. This, however, requires that you do your homework, understanding your company and its products, the market it competes in and the competitors it faces. In making this assessment, you can draw on the following:

- The company's business: One of the most crucial components in constructing a business story for a company is identifying the business it is in, and while this may seem obvious, it is more difficult than it looks. For instance, when asked what business Facebook is in, many would respond social media, but social media is a platform for delivering other businesses, not a business by itself. Facebook, at least in 2023, generated almost all of its revenues from advertising, and assuming that they will stay in advertising will frame your story for Facebook.
- The company's financial history: In framing your story for a company, you should look at its financial history, not because you believe that past is prologue but because assuming that history (in terms of past growth and profitability) will repeat itself is a story that needs justification, as is assuming a break from history (for example, from high to low growth or from being money losing to money making). As we will see in the coming chapters, one reason analysts have trouble valuing young companies and start-ups is an absence of history.
- Total market history and growth: The history of growth in the total market for the company's products and services with assessments for growth in the future is a key determinant of your company story. It is easier to tell a story of high growth when you are a company in a growing market (NVIDIA in the AI chips business in 2023) than if you are one in a stagnant or declining market (Coca Cola with soft drinks and Altria with tobacco in 2023).
- *The competition:* While being in a growing market gives you a tailwind, if you are a company in that market, you will face competition, and history is full of companies that crash and burn in growing markets. In crafting your company's story, you need to think about the competitive advantages that your company possesses (or does not possess) and how these will evolve over time. Companies that operate in businesses

- that have few or no competitive barriers to entry will find themselves working harder to deliver growth, and their business stories will have to reflect this constraint.
- The macroeconomy: To the extent that companies and industries are exposed to macroeconomic risk, your story will have to incorporate what you see occurring on that front. Thus, if you are valuing a cyclical company, your assessment of the economy may become part of your company's story, and with an oil company, what you think about the future course of oil prices will be a key part of your company story.

As you craft a business story for your company, it is worth reminding yourself that you are not a creative novelist and that you are creating a foundation for a valuation. Consequently, you should aim to do the following:

- *Keep it simple:* When telling business stories for companies, it is easy to get distracted by strands of these stories that may be interesting but that have little relevance for value. The most powerful business stories in valuation tend to be compact, boiling the company down to its core. In our valuations of Amazon from 1997 to 2012, our core story for Amazon was that it was a *Field of Dreams* company, built around the belief that if you build it (revenues), they (profits) will come, and in our valuations after 2013, the story shifted to that of a *Disruption Machine*, a company that would go after any business that it felt had soft spots that could be exploited by a more efficient and patient player.
- Keep it focused: No matter what business you are valuing, the end game, for it to be valuable, is that it must make money. In short, a business story, even if it is not money making now, must include pathways to make money in the future.

The company that we will use to illustrate this process is Zomato, an Indian restaurant-delivery company, at the time of its initial public offering in 2021. At the time of the IPO, Zomato had modest revenues and big operating losses, but it had a significant market share of the Indian restaurant delivery market, with two major competitors (Zwiggy and Amazon Foods). Building a story

for Zomato requires an understanding of the Indian restaurant delivery market and its potential for growth. In Table 5.1, we looked at the size of the Indian restaurant food delivery market, relative to the US, the EU, and China.

Table 5.1 Restaurant Food Delivery Markets (in US\$) in 2020

2020				
		Uni teHits ate	es	
General				
GDP in	\$2.71	\$14.70	\$20.93	\$15.17
2020 (in				
trillions of				
US\$)				
Population	1360	1430	330	445
(millions)				
Per capita	\$1,993	\$10,280	\$63,424	\$34,090
GDP				
Number of	1000	9000	660	890
restaurants				
(in 000s)				
Food				
Delivery				
Online	43%	63%	88%	90%
access				
(percent)				
Online food	50.00	450.00	105.00	150.00
delivery	T			
users				
(millions)				
Online food	\$4,200.00	\$90,000.00	\$21,000.00	\$15,000.00
delivery				<u> </u>
market (\$				
million) in				
2019				
Online food	\$2,900.00	\$110,000.0)\$49,000.00	\$13,800.00
delivery				
market (\$				

million) in 2020

As you can see, the Indian food delivery market lags the other three markets in size and per-capita usage, but some of that difference can be attributed to differences in wealth (India's lower GDP) and Internet service (since Zomato's delivery is through a phone app). Some of it can also be attributed to cultural differences, with Indians less likely to eat out at restaurants than their American and Chinese counterparts.

Our story for Zomato includes components that relate to the country and trends in restaurant eating in India:

- The Indian food delivery/restaurant market will grow, as Indians become more prosperous and have increased online access, to reach \$25 billion (₹1,800–₹2,000 billion) in 10 years.
- The market will continue to be dominated by two or three large players, albeit with lots of localized and niche competitors, and they will continue to command a significant slice of the market. Zomato will be one of the winners/ survivors and will have a market share of 40% of the total Indian restaurant-delivery market.
- Zomato's revenues represent the percent of the gross orders placed on that platform that accrue to the company. While that number was 23.13% of gross orders in 2020 and 21.03% in 2021, we will assume that share will converge on 22% in future years as the delivery market matures and competition takes form.
- The biggest expenses at intermediary businesses such as Zomato, which connect customers with businesses, are often on customer acquisition and marketing, and as growth scales down, these expenses should decrease as a percent of revenues, delivering a profitability bonus. We will assume that pretax operating margins will trend toward 30%, largely because we believe that the market will be dominated by a few big players, but with the very real possibility that one rogue player that is unwilling to play the game can upend profitability.

- Zomato's reinvestment, to generate revenue growth, will be investments in technology and in acquisitions, and this need will continue in the near future, with a lightening up in later years, as growth declines.
- In terms of operating risk, the company, despite its global ambitions, is still primarily an Indian company, dependent on Indian macroeconomic growth to succeed, and our rupee cost of capital will incorporate the country risk.
- Zomato is a money-losing company, but it is not a start-up. On the plus side, its size and access to capital, as well as its post-IPO augmented cash balance, push down the risk of failure. On the minus side, this is a company that is still burning through cash and will need access to capital in future years to continue to survive. Overall, we will attach a likelihood of failure of 10%, reflecting this balance.

In effect, in our story, Zomato remains primarily a restaurant delivery business, with supplemental income coming from its forays into grocery deliveries and health products.

Step 2: The 3P Test

Once you have constructed a business story for your company, you must stop and check to see whether your story passes what we call the 3P test, i.e. Is it possible? Is it plausible? Is it probable? We capture the differences between the three tests in Figure 5.2.

As you go from possible to plausible to probable, you are making the tests more stringent, requiring more compelling explanations or more data from the storyteller. The "possibility" test is the weakest of the three, requiring only that you show that there is some pathway that exists for your story to hold and that it is not a fairy-tale. The "plausibility" test is stronger and requires evidence that you have succeeded, at least on a smaller scale (a market test, a geography), with your business. The "probability" test is the most difficult one since you must show that your business story can scale up and that your barriers to entry work.

For companies with long histories in a business and established track records, passing the 3P test is easy if you assume that they will continue in the same business. Assuming that Coca Cola will grow at the same rate as the soft-drink beverage market or that Altria will see shrinkage in revenues, as cigarette smoking continues to decline, is unlikely to get pushback, but a story of Coca Cola transitioning to become an alcohol company or Altria expanding into cannabis will require more explanation and a stronger backing.

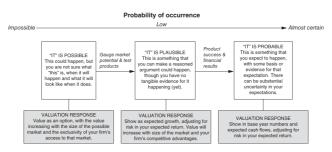


Figure 5.2 Valuation Stories—The 3P Test

With Zomato, it was a more challenging test, since it is growing a disruptive delivery model in a market (Indian restaurant delivery) that is itself evolving and growing. Building the Zomato story around restaurant food delivery makes it easier to defend, because Zomato had succeeded in that business, at least in terms of delivering revenue growth and a significant market share. There were others telling bigger stories for Zomato in 2021, ranging from it being a grocery delivery business to a retail platform for a wider array of products, and they would have faced tougher (albeit still passable) tests.

Step 3: Connecting Stories to Inputs

For a story to become part of a valuation, you must convert its parts into valuation inputs. If you have a valuation model with dozens of inputs and complex output, this will become difficult, if not impossible, to do. One reason that we believe valuations

should be parsimonious, with as few inputs as possible and limited output, is because they lend themselves much more easily to story connections. In Chapter 3, we introduced the basics of valuation and argued that you can tie the value of a company to a handful of inputs, and we summarize those in Figure 5.3.

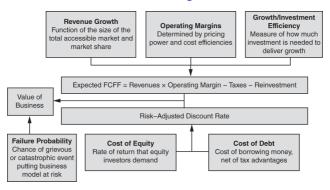


Figure 5.3 The Drivers of Value

Breaking down the inputs, the cash flows of a firm can be written as a function of three key drivers:

- *Growth:* The growth component of a business story is best captured in *revenue growth*, with that growth coming from either more units being sold or a higher price per unit (or both). That revenue growth rate will be higher in larger markets, making the total market for a product or service a key driver, and lower for larger companies in that market, since scaling will work against them.
- *Profitability:* The profitability of a business story shows up in the operating margin that you estimate for the company. In making this estimate, you should start by looking at unit economics, i.e. how much it costs a company to produce an extra unit for sale, with better unit economics translating into higher operating margins. A well-run software company will generate much higher operating margins in steady state than a well-run chemical or automobile company.
- Investment efficiency: To grow revenues, companies must reinvest, with that reinvestment being in plant and equipment for manufacturing companies and R&D and acquisitions for technology companies. The efficiency with which growth is

generated can be measured by looking at the dollars in revenues that a company can generate for every dollar invested (sales to invested capital), with more efficient companies delivering higher revenues.

There are two inputs that encapsulate the risk you see in the business:

• Operating risk: In Chapter 3, we went through the process of computing the cost of capital for a company, but a bigpicture perspective of the cost of capital is that it measures the operating risk in a business. Suffice to say that businesses that face more operating risk should have higher costs of capital, and to provide perspective on what constitutes a high or low cost of capital, we report the distribution of costs of capital, by region, for global companies in January 2023 in Table 5.2.

While these are in US dollars, converting them into other currencies is simply done by incorporating the differential inflation between the US dollar and those currencies. Thus, if expected inflation is 3% in the US and 5% in India, the median cost of capital in Indian Rupees for an Indian company would be 13.19% (adding 2% to the median cost of capital for an emerging market company).

Table 5.2 Costs of Capital for US and Global Companies in US\$, July 2023

Decile/	US	Emerging	Europe	Japan	Global
Quartile		Markets			
1st decile	6.01%	8.08%	7.26%	7.71%	7.39%
(lowest L					
risk)					
First	7.26%	9.56%	8.64%	9.07%	9.08%
quartile L					
Median	9.63%	11.19%	10.41%	10.72%	10.60%
Third	10.88%	12.97%	12.02%	11.50%	12.07%
quartile					
9th	11.63%	15.31%	14.25%	13.10%	14.04%
decile					

(highest risk)

• Failure risk: Discounting free cash flows to the firm back at the cost of capital yields a value for the operating assets of the firm if the firm survives as a going concern. With young firms or distressed companies, where there is a material chance of failure, you should assess the risk of this failure and assess your value if that happens, rather than try to increase your discount rate to incorporate the risk.

Thus, to connect a business story into value, you must consider which of these inputs to change to reflect that story. Thus, if the key selling point of your business story is that it has a large potential market, it is revenue growth that will best reflect that belief, whereas if it is that your company has significant advantages (technological, brand name, patent protection) over its competition, it will show up as higher market share. Figure 5.4 summarizes the links between key components of business stories and valuation inputs.

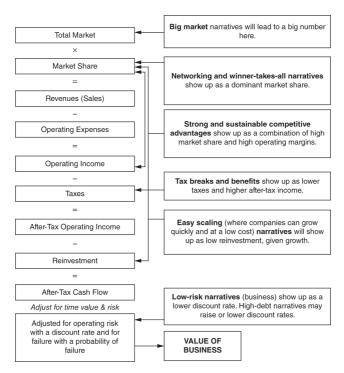


Figure 5.4 Stories and Valuation Inputs

Applying this framework to Zomato at the time of its IPO in 2021, we converted our story into valuation inputs, with the total market being the Indian restaurant food delivery market. Figure 5.5 shows the link between the story and inputs for Zomato in June 2021.

Note that every part of the story plays out in a valuation input and that changing your story for Zomato will alter these inputs and its value.

Step 4: From Inputs to Value

Once you have converted your story to valuation inputs, the process of converting those inputs into forecasted numbers and value is mechanical. Specifically, you use revenue growth to obtain expected revenues in future years, and then applying forecasted margins to these revenues yields operating profits, as

can be seen in Table 5.3, for our Zomato story.

Next, we bring in the effects of taxes and reinvestment. Note that the company pays no taxes in year 1, when it loses money, and uses carried-forward operating losses to shelter much of its profits in year 2 from settling into a 25% tax rate. The assumptions about investment efficiency about the sales-to-capital ratio allow you to estimate reinvestment and free cash flows, as can be seen in Table 5.4.

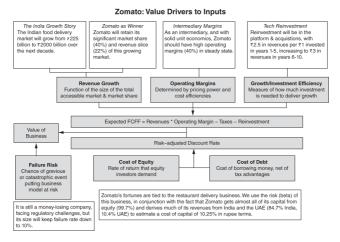


Figure 5.5 Stories and Valuation Inputs—Zomato in June 2021

	Total	Market	RevenueRe	evenu © peratid	B IT
	market	share	share	margin	
11	₹337,50	0 41.72%	້າ 22.00% ₹3	30,975–10.00% -	-₹3,097
2	₹438,75	0 41.29%	ົ່ງ 22.00% ₹3	39,853 -1.25%	-₹ 498
3	₹570,37.	5 40.86%	5 22.00% ₹5	51,270 6.88%	₹3,527
4	₹741,48	3 40.43%	ົ່ວ 22.00% ₹ເ	65,95 12.50%	₹8,244
5	₹963.93	4 40.00%	ົ່ງ 22.00% ₹8	84.826 18.13%	₹15,379
6	₹1,203,47	1 40.00%	⁵ 22.00%₹10	05,905 20.23%	₹21,425
7	₹1,440,55	5 40.00%	⁵ 22.00%₹12	26,769 27.61%	₹35,001
8	₹1,650,15	6 40.00%	້າ 22.00%₹14	45,214 35.00%	₹50,825
9	₹1,805,27	1 40.00%	ົ່ງ 22.00%₹15	58,864 35.00%	₹55,602
			H		

To get to value per share, we discount the cash flows back at the costs of capital (10.25% to start, drifting down to 8.97% by year 10) that we have estimated for the company. To complete the valuation, we estimate the value at the end of year 10. To do so, we assume a growth rate in perpetuity of 4.25%, in Indian rupees, and a return on capital of 12% after year 10:

Table 5.4 Free Cash Flows to the Firm and Present Value at Zomato in 2021

Year	EBIT	Tax	EBIT	Reinvest	MENT Cost of PV	7
		rate	× (1 –		capital	
			t)			
1	-	- 0.009	, -	- ₹4,415	10.25%	-
	₹3,09′	7	₹3,09′	7 ₹	7,512 \$6	5,814
2	₹49	3 0.009	₹498	₹3,551	10.25%	
				₹	3,053 \$2	2,512
3	₹3,52′	7 6.639	₹3,293	3 ₹4,567	10.25%	\$950
				₹	1,273	
4	₹8,24	125.009	₹6,183	3 ₹5,872	₹31 10.25%	\$210
5	₹15,379	925.029	₹11,53	₹6,292 ₹	5,23910.25% \$3	3,216
6	₹21,42	525.029	₹16,06	5 ₹7,026 ₹	9,03910.00% \$:	5,044
7	₹35,00	124.999	₹26,25£	} ₹6,95₄ ₹ 1	9,299 9.74% \$9	9,813
8	₹50,82	525.009	₹38,11 <u>9</u>) ₹6,14\₹3	1,970 9.48%\$14	1,848
9	₹55,602	225.009	₹41,702	2 ₹4,55(₹3	7,152 9.23%\$1:	5,797
10	₹57,96	525.00%	₹43,474	₽₹2,25 ₹ 4	1,224 8.97%\$10	5,085

Terminal value

$$= \frac{A f ter\text{-tax operating income in year } 11 \times \left(1 - \frac{G rowth rate}{ROC}\right)}{\left(Cost of capital - G rowth rate\right)}$$

$$=\frac{43,474(1.0425)\times\left(1-\frac{0.0425}{0.12}\right)}{0.0897-0.0425}=$$

Discounting this value back and adding it to the present value of

the cash flows yields a value for the operating assets. To get to value per share, we subtract out debt, add the cash balance (including expected proceeds from the IPO), and divide by the number of shares that will be outstanding after the public offering.

Present value of terminal	₹241,972
value	
+ Present value of FCFF over	₹54,737
next 10 years	
= Value of operating assets	₹296,709
 Adjustment for failure 	₹14,835
= Value of operating assets	₹281,873
adjusted for failure	
 Debt & Minority interests 	₹1,592
+ Cash (includes marketable	₹135,960
securities)	
= Value of equity	₹416,245
 Value of equity options 	₹73,245
Number of shares	7,946.68
Value per share	₹43.16

This process yields a value per share of about ₹43, but it is worth pausing and reminding yourself at each stage how our story is playing out in the numbers.

Step 5: Keeping the Feedback Loop Open

Let us assume that you have a story for your company and you have made sure that the story passes the 3P test, converted the story into value inputs, and valued the company. As you celebrate, it is worth reminding yourself that this is not the value for the company but *your* value, reflecting *your* story and inputs, and that you will be wrong. That is why it so critical to keep the valuation process open for feedback, especially from those who disagree most strongly with you. As you read or listen to their critiques, rather than react defensively, you should consider using their arguments to strengthen and solidify your story.

With the Zomato valuation, there were many who disagreed with

us on our valuation, offering alternative stories for the companies, yielding much higher or lower values. Those with the higher-value stories were backed up by the market, since trading in the company opened at ₹72, and the stock continued its rise in the months after to reach ₹150. To see how alternative stories play out in valuation, we estimated the value, with these stories, and classified the valuations based on the 3P test, in Table 5.5.

You may read this table as implying that anything goes when it comes to value, but that is not our reading of it. It is true that the value for Zomato can shift dramatically based on the story you craft for the company, but not only is that true for all young companies, but not all stories are equally plausible. Specifically, when investing in a young company, you must find a story that you believe is plausible and that you believe in, and accept the fact that there will be other investors who will disagree with you. With more mature companies, there is less room for stories to diverge, and you will find more consensus on their valuations. Since the payoff in investing comes from being less wrong than others looking at the same company, it adds credence to the argument that the payoff to doing valuation is greater at young companies, where there is more disagreement about value, than in more mature companies.

Table 5.5 Zomato—Alternative Stories and Value per Share

Zomato Story	Total market		Revenu slice		Cost of capital	
	(in				1	
Delive₹	millions 5,000,000	7	25.00%	45.00%	9.50%	₹150.02
juggerna						
Delive t	5,000,000) 40%	22.00%	35.00%	9.50%	₹93.00
star						
Delive ₹	5,000,000) 40%	5 15.00%	25.00%	10.99%	₹61.55
leader +						
competi	tion					
Restau	3,0 00,000) 40%	25.00%	45.00%	9.50%	₹94.31
delivery						

juggernaut	
+ high	
growth	
India	
Restau ₹3:0 00,000 40% 22.00% 35.00% 9.50% ₹59.02	2
delivery	_
star +	
high	
growth	
India	
Restau ₹3:0 00,000 40% 20.00% 25.00% 10.99% ₹35.52	2
delivery	_
+	
competition	
+ high	
growth	
India	
Our ₹2,000,000 40% 25.00% 45.00% 10.25% ₹56.66	ó
story,	-
positive	
Our ₹2,000,000 40% 22.00% 35.00% 10.25% ₹39.48	3
story	_
Our ₹2,000,000 40% 20.00% 25.00% 10.25% ₹26.16	ó
story,	_
negative	
Restau ₹int 25,000 40% 25.00% 45.00% 9.50% ₹36.48	3
delivery	_
juggernaut	
+ low	
growth	
India	
Restau rini 25,000 40% 22.00% 35.00% 9.50% ₹24.02	2
delivery	-
star +	
low	
growth	
India	
	_

Story Resets, Changes, and Breaks

One of the advantages of building a valuation around a story is that it gives you perspective when examining news stories that emerge about the company or assessing the effect of earnings reports. Instead of focusing on the hype that a new CEO may bring to a company or whether a company reported earnings that beat analyst expectations by three cents or five, you can instead turn your attention to how much, if at all, the new CEO will alter the company narrative and the news in the earnings report that may lead you to change your story for a company. Broadly speaking, story changes can fall into three groups:

- 1. Story breaks: An event that undercuts the entire business model on which your valuation story is built can cause your story and value to implode. With a young pharmaceutical company, this may take the form of fatal reactions to a promising drug that is in the company's product pipeline, and for a company dependent on regulatory approval, it can be a removal of a license or approval to operate. With Zomato, for instance, a decision by the government to crack down on restaurant food deliveries through apps could be fatal for value.
- 2. Story changes: An event that leads you to reassess your core story as either too expansive or too restrictive should lead you to change your story and value for the company. With Zomato, an earnings report that contains news about a breakthrough that allows the company to expand beyond restaurant deliveries to grocery deliveries would greatly expand the story and push up value, whereas an

- announcement by Zwiggy (a competitor) that the company plans to reduce its take (share of gross billing claimed as revenue) will spill over into the profitability part of your story for Zomato.
- 3. Story shifts: The core story may not break or change, but you may reassess the contours of that story based on either macroeconomic developments or stories about the company. The growth in the Zomato story comes from the assumptions that the Indian economy will grow strongly and that the restaurant business in the country will grow even more. Information that you receive that leads you to reassess one or both assumptions will play out as alterations in your story and value for the company.

Just as a warning, it is easy for investors to fall in love with their valuation narratives and resist or deny news stories that push against these stories. Maintaining a balance between having enough faith in your valuation so that you do not abandon it at the slightest hint of trouble and not having so much conviction that you hold on to it even when the data suggests that you should let go is one of the toughest challenges in investing.

Stories + Numbers

While a valuation ultimately comes from numbers, on revenues, earnings, and cash flows, there is a story embedded in these numbers. For a valuation to be credible, you must not only be aware of that story but also check that story to see if it passes the reasonableness test. Your valuation is as much a function of the story that you are telling about a company as it is of the numbers you use to back up that story. If there is a message in this chapter, good valuations require that you use both the numbers and story sides of your brain and that you work on your weaker side.

Note

1 Since the costs of capital are changing, to discount the cash flows in year 7, you have to use a cumulated cost of capital = $19,299/(1.1025)^7$ (1.10) (1.0974) = \$9,813 million.

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Chapter Six



Promise Aplenty: Valuing Young Growth Companies

IN LATE 2012, FACEBOOK (META) attempted to buy a young tech company called Instagram for \$1 billion. At the time, Instagram had been in existence for only two years, had barely any revenues, and was reporting operating losses. The firm clearly had growth potential, but there were huge uncertainties about its business model. In assessing the bid, analysts were nonplussed, unsure about how to value a company with almost no operating history and market price data.

If every business starts with an idea, young companies can range from idea companies (those with no revenues or products) to start-up companies that are testing out product appeal to second-stage companies that are moving on the path to profitability. Figure 6.1 illustrates the diversity of young growth companies.

Most young growth companies tend to be privately owned and funded, either entirely by their founders/owners or by venture capitalists. In the last two decades, though, companies in some sectors such as technology and biotechnology have been able to leapfrog the process and go public. When they do go public, they offer a blend of promise and peril to investors who are willing to grapple with the uncertainties that come with growth potential. Young companies share some common attributes:

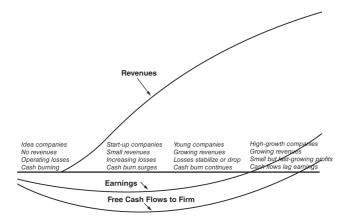


Figure 6.1 The Early Stages of the Business Life Cycle

- *No historical performance data:* Most young companies have only one or two years of data available on operations and financing and some have financials for only a portion of a year.
- *Small or no revenues, operating losses:* Many young companies have small or nonexistent revenues. Expenses often are associated with getting the business established, rather than generating revenues. In combination, the result is significant operating losses.
- *Many don't survive:* The statistics maintained by the Bureau of Labor Statistics, in the United States, concluded that only 45 percent of all businesses that were founded in 2006 survived at least 5 years and only 24 percent made it through 15 years.
- *Investments are illiquid:* Equity in privately owned businesses is illiquid, even if highly priced or valued. Even those that are publicly traded tend to have small market capitalizations and relatively few shares traded (low float). A significant portion of the equity is usually held by the founders, venture capitalists, and other private equity investors.
- Multiple claims on equity: It is not uncommon for some equity investors to have first claims on cash flows (dividends) and others to have additional voting right shares or special

protections, making equity claims unequal.

• Stock-based compensation: While many companies, across the life cycle, use equity in the form of restricted stock and options to compensate employees, young companies tend to use them disproportionately, usually because they lack the cash to pay employees.

While each of these characteristics individually does not pose an insurmountable problem, their coming together in the same firm creates the perfect storm for valuation. It is no wonder that most investors and analysts give up.

Valuation Issues

In intrinsic valuation, estimating each of the four pieces that determine value—cash flows from existing assets, expected growth in these cash flows, discount rates, and the length of time before the firm becomes mature—all become more difficult for young firms. Existing assets often generate little or negative cash flows, and estimating future revenues and discount rates becomes more difficult because of limited or nonexistent historical data. This estimation challenge gets even more daunting when we bring in the possibility that the firm may not survive to become a stable firm and that there may be multiple claims on equity. As a consequence, most investors don't even try to value young growth companies on an intrinsic basis and rely instead on compelling stories to justify investment decisions.

Some analysts try to price young companies using multiples and comparable firms. However, this task is also made more difficult by the following factors:

- What do you scale price to? Young companies often lose money (both net income and EBITDA are negative), have little to show in terms of book value, and have minuscule revenues. Scaling market pricing to any of these variables is going to be difficult.
- What are your comparable companies? Even if a young company operates in a sector where there are many other

- young companies, there can be significant variations across companies. For young companies in mature sectors, the task of finding comparables will be even more challenging.
- How do you control for survival? Intuitively, we would expect the pricing of a young company (the multiple of revenues or earnings that we assign it) to increase with its likelihood of survival. However, putting this intuitive principle into practice is not easy to do.

In summary, there are no easy valuation or pricing solutions to the young firm problem.

Valuation Solutions

In this section, we will begin by laying out the foundations for estimating the intrinsic value of a young company, move on to consider how best to adapt relative valuation for the special characteristics of young companies, and close with a discussion of how thinking about investments in these companies as options can offer valuation insights.

Intrinsic Valuation

When applying discounted cash flow models to valuing young companies, we will move systematically through the process of estimation, considering at each stage how best to deal with the characteristics of young companies. To illustrate the process, we will value Airbnb (ABNB), a company that upended the hospitality and hotel business, at the time of its IPO in November 2020. The firm had been in existence just over a decade but had shown high growth potential, with revenues increasing more than five-fold, from \$919 million in 2015 to \$4.8 billion in 2019. However, the company's business model was still in flux, as it reported operating losses of \$501 million in 2019. Adding to the uncertainty in this valuation was the COVID shutdown of the global economy, with the hospitality business among the most

affected. As a result, in the trailing 12 months leading into this valuation, Airbnb's revenues dropped to \$3.6 billion, and its losses ballooned to \$818 million.

Estimating Future Cash Flows There are three key numbers in forecasting future cash flows. The first is revenue growth, which can be obtained either by extrapolating from the recent past or by estimating the total market for a product or service and an expected market share. The potential market for a company will be smaller if the product or service offered by the firm is defined narrowly and will expand if we use a broader definition. Defining Airbnb as an apartment-rental company will result in a smaller market than categorizing it as being in the hospitality business. The next step is to estimate the share of that market that will be captured by the firm being analyzed, both in the long term and in the time periods leading up to it. It is at this stage that you will consider both the quality of the products and management of the young company and the resources that the company can draw on to accomplish its objectives.

Airbnb's management has shown competence and creativity, and the networking benefits of being the largest network for rentals will allow it not only to continue winning market share from hotels but also give it an advantage over other companies that try to imitate it. We estimate the gross bookings on Airbnb's platform will grow 40% in 2021, as the COVID shutdown eases, and that the annual growth rate will be 25% in the next four years; and that growth rate will scale down to 2% by year 10. Airbnb's revenues come from the share of these gross bookings that it claims, and we expect that percentage to increase from 12.65% in the next 12 months to 14% over the next decade, because of market power and economies of scale. Table 6.1 summarizes the gross bookings and revenue projections for Airbnb.

VALUE DRIVER #1: REVENUE GROWTH

Small revenues must become big revenues for a young business to become valuable. How quickly can your company grow?

A firm can have value only if it ultimately delivers earnings. Consequently, the next step is estimating the operating expenses associated with delivering the projected revenues, and we would separate the estimation process into two parts. In the first part, we would focus on estimating the target operating margin when the firm becomes mature, primarily by looking at more established companies in the business. In making these estimates, you should treat all stock-based compensation as expenses, notwithstanding the fact that they are not explicitly in cash; payments in equity are more akin to payments in kind and are thus expenses. You will be helped by the fact that accountants have finally come to this recognition and both generally accepted accounting principles (GAAP) and international financial reporting standards (IFRS) treat option and restricted stock grants as expenses.

Table 6.1 Expected Revenues for Airbnb (in \$ millions)

	Growth rate	Gross bookings	Airbnb share (%)	Revenues
LTM		\$26,492	2	\$3,626
1	40.00%	\$37,089	12.65%	\$4,692
2	25.00%	\$46,36	12.92%	\$5,990
3	25.00%	\$57,95	13.06%	\$7,565
4	25.00%	\$72,439	13.19%	\$9,555
5	25.00%	\$90,548	3 13.33%	\$12,066
6	20.40%	\$109,020	13.46%	\$14,674
7	15.80%	\$126,245	5 13.60%	\$17,163
8	11.20%	\$140,385	5 13.73%	\$19,275
9	6.60%	\$149,650	13.87%	\$20,749
10	2.00%	\$152,643	3 14.00%	\$21,370
Terminal	2.00%	\$155,690	14.00%	\$21,797
year				

We assume that Airbnb's pretax operating margin, currently an abysmal -22.56 percent, will improve to 25 percent, a little lower

than the margins delivered by Booking.com, the only competitor of similar scale and business model. In the second part, we can then look at how the margin will evolve over time; this "pathway to profitability" can be rockier for some firms than others, with fixed costs and competition playing significant roles in the estimation. The product of the forecasted revenues and expected operating margins yields the expected operating income. To estimate taxes due on this income, consider the possibility of carrying forward operating losses from earlier years to offset income in later years. The net operating loss of \$167.6 million that Airbnb has accumulated in the past and the losses it is expected to generate over the next two years shelter its income from taxes until the fifth year.

Growth requires reinvestment. With a manufacturing firm, this will take the form of investments in additional production capacity, and with a technology firm it will include not only investments in R&D and new patents but also in human capital (hiring software programmers and researchers). For Airbnb, the reinvestment will take the form of acquisitions of smaller firms, primarily for their niche markets or technology, and investments in the platform. Based on Airbnb's reinvestment history and the reinvestment at competitors (Expedia and Booking), we estimate that every \$2.00 in additional revenue will require a dollar in capital invested.

VALUE DRIVER #2: TARGET MARGINS

You can lose money today, but you have to make money in the future. When mature, what is the likely operating profit margin for your company?

In Table 6.2, we estimate the earnings and cash flows for Airbnb. The expected cash flows are negative for the next six years, and existing equity investors will see their share of the ownership either reduced (when new equity investors come in) or be called upon to make more investments to keep the business going.

As margins improve, the company's losses become profits. Early on, the company pays no taxes, because it is money-losing, and in the first two years that the company makes money (years 3 and 4), operating losses carried forward from prior years shield the company from taxes. The free cash flows stay negative for longer, largely because of reinvestment needs, but as growth slackens, cash flows turn positive.

VALUE DRIVER #3: EFFICIENCY IN DELIVERING GROWTH (REINVESTMENT)

The value of growth comes from how efficiently you can deliver it. How much reinvestment will your firm have to make to deliver your anticipated growth?

Table 6.2 Expected Earnings and Cash Flows (in \$ millions) for Airbnb

Op RIES Billing (1)	
\$3,62 6 22.56% -\$8 LTM 0.00%	-\$818
\$4,69210.00% -\$46910.00%	-\$469\$532.9\$(1,002)
\$5,990-3.00% -\$18020.00%	- \$180\$649.05 \$(829)
\$7,565 0.50% \$3830.00%	\$38\$787.84 \$(750)
\$9,555 4.00% \$38240.00%	\$382\$994.58 \$(612)
\$12,066 7.50% \$905\$4.05%	\$7\$8,255.45 \$(478)
\$14,674 9.52% \$1,39725.00%	\$1,0\$8,304.27 \$(256)
\$17,16313.39% \$2,29825.00%	
\$19,27517.26% \$3,32725.00%	
\$20,74921.13% \$4,38495.00%	
\$21,37025.00% \$5,34305.00%	
\$21,79725.00% \$5r44f125.90ff	\$4,087\$817.40 \$3,270

Estimating Discount Rates There are two problems that we face in estimating discount rates for young companies. The first is that the market history available is too short and volatile to yield reliable estimates of beta or cost of debt. The second is that the cost of capital can be expected to change over time as the young company matures. To overcome the lack of history, we would suggest an approach that looks at the company's business, rather than the company itself, and adjusting for key differences. In effect, we use sector averages or even market-wide statistics for discount rates, adjusted for the higher risk of younger companies. Thus, in the early years, costs of equity and capital will be much higher for young companies than for more mature counterparts in the same business. To incorporate the changes over time, move the cost of capital toward sector averages, as the young company grows and matures. For Airbnb, the current cost of capital of 8.5 percent reflects its higher risk, given its status as a money-losing company, still seeking a business model. As the firm matures, we expect the cost of capital to drop to 7.12 percent as Airbnb's risk moves toward that of the average company in the market.

VALUE DRIVER #4: RISK IN OPERATIONS

The greater the risk in a firm's operations, the less value you will attach to it. How much operating risk do you see in your company?

Estimating Value Today and Adjusting for Survival Once cash flows for the forecast period have been estimated and discounted, you still must determine what will happen at the end of the forecast period, adjust the value for the possibility of failure, and examine the impact of losing key people in the company.

Terminal Value The terminal value can be 80, 90, or even more than 100 percent of value for a young firm; the more than 100 percent will occur when cash flows are very negative in the near years, requiring fresh capital infusions. The basic principles that govern terminal value remain unchanged: the growth rate used must be less than the growth rate of the economy, the cost of capital must converge on that of a mature firm, and there has to be enough reinvestment to sustain the stable growth. Airbnb is assumed to become a mature company after year 10, growing at 2 percent a year, with a cost of capital of 7.12 percent befitting its mature firm status, and reinvesting 20 percent of its earning to sustain this growth (based on a return on capital of 10 percent forever).

Terminal value =
$$\frac{EBIT(1-t)(1-Reinvestment \ rate_{Stable \ growth})}{Cost \ of \ capital_{Stable \ growth} - Stable \ growth \ rate}$$

$$= \frac{\$4,087(1-0.20)}{0.0712-0.02} = \$63,860 \text{ million}.$$

Discounting the expected cash flows for the next 10 years and the terminal value back at the cost of capital yields a value of \$29,567 million for the operating assets today, as can be seen in Table 6.3.

Since the cost of capital changes over time, the discounting must reflect a compounded cost of capital.

Table 6.3 Free Cash Flows (in \$ millions) and Value for Airbnb

Year	\Box C	um(Ratelli (Ellini fiel apital	
1	8.50%	1.0850 -\$1,002	-\$924
2	8.50%	1.0852 = -\$829	-\$704
		1.1772	
3	8.50%	$1.085^3 = -\$750$	-\$587
		1.2773	
4	8.50%	1.0854 = -\$612	-\$442

		1.3859			
5	8.50%	1.0855 = -\$	6478		-\$318
		1.5037			
6	8.22%	1.0855 -\$	6647		+\$397
		(1.0822)			
		= 1.6273			
7	7.95%	1.0855 \$1	37		\$78
		(1.0822)			
		(1.0795)			
		= 1.7567			
8	7.67%	1.0855 \$1	,183		\$626
		(1.0822)			
		(1.0795)			
		(1.0767)			
		= 1.8914			
9	7.40%	1.0855(1.082	2,24)13		\$1,188
		(1.0795)			
		(1.0767)			
		(1.074) =			
		2.0313			
10	7.12%	1.0855(1.083	2,3 996	\$63,860	\$31,047
		(1.0795)			
		(1.0767)			
		(1.074)			
		(1.0712)			
		= 2.1759			
Value of		\$2	9,567		
operati	ng				
assets =	=				
188018 -	-				

Adjust for Survival To deal with the risk of failure in a young firm, try a two-step approach. In the first step, value the firm on the assumption that it survives and makes it to financial health. This, in effect, is what we are assuming when we use a terminal value and discount cash flows back to today at a risk-adjusted discount rate. In the second step, bring in the likelihood that the firm will

not survive. The probability of failure can be assessed most simply by using sector averages. Earlier in the chapter we noted a study that used data from the Bureau of Labor Statistics to estimate the probability of survival for firms in different sectors from 2006 to 2021. While it is not easy to translate the numbers in this table into failure statistics for individual firms, we will assume that the risk of failure in Airbnb is low but not insignificant, at 10%, and that its value will be halved, in failure. This ratio will be affected by specifics about the firm being valued: the quality of its management, its access to capital, and its cash balances. The value of the firm can be written as an expected value of the two scenarios—the intrinsic value (from the discounted cash flows) under the going concern scenario and the distress value, estimated at half of fair value, under the failure scenario.

Airbnb's failure-adjusted value:

$$= $29,567(0.9) + [$29,567(0.5)](0.1) = $28,088$$
 million.

Value per Share The process of getting from the value of the operating assets to equity value per share starts with adding back the cash and marketable securities held by the firm; if the firm is making a public offering or raising a new round of equity, the cash infusion should be included. While young companies tend not to carry much debt, you should net out any debt that they owe and, as a final step, reduce the equity value of the firm by the value of any options that the firm may have granted to employees that are still outstanding. To get to equity value per share, you divide by the number of shares outstanding today, including any restricted shares. Adding Airbnb's cash balance (\$4,495 million) and proceeds from its initial offering (\$3,000 million) and then subtracting out its debt (\$2,192 million) yields a value of \$33,391 million for its equity. Finally, to get a per-share value, we net out the estimated value of management options that are

outstanding (\$1,737 million) and divide by the share count (671.06 million shares):

Value per share
$$= \frac{(28088 + 4495 + 3000 - 2192 - \$1,737)}{671.06} = \$47.17$$

VALUE DRIVER #5: SURVIVAL SKILLS

For young firms to become valuable, they have to survive. What are the factors that may cause your firm to fail?

Note that while Airbnb is expected to issue new shares in the first six years to cover the negative free cash flows, we do not consider those shares. The present value of those negative cash flows lowers the equity value today and thus already incorporates the effect of the dilution.

Key Person Discounts Young companies, especially service businesses, are often dependent on the owner or a few key people for their success. Consequently, the value we estimate for these businesses can change significantly if one or more of these key people will no longer be associated with the firm. To assess a key person discount in valuations, first value the firm with the status quo (with key people involved in the business), and then value it again with the loss of these individuals built into revenues, earnings, and expected cash flows. To the extent that earnings and cash flows suffer when key people leave, the value of the business will be lower with the loss of these individuals, thus leading to a "key person discount." With Airbnb, the value derives more from the platform and the users on that platform; hence, there is no need for a key-person discount.

Relative Valuation/Pricing

Relative valuation is more challenging with young firms that have little to show in terms of operations and face substantial risks in operations and threats to their existence for the following reasons:

- Life cycle affects fundamentals: To the extent that we are comparing a young firm to more mature firms in the business, there are likely to be significant differences in risk, cash flows, and growth across the firms.
- *Survival:* A related point is that there is a high probability of failure in young firms. Firms that are mature and have a lower probability of failure should therefore trade at higher market values for any given variable such as revenues, earnings, or book value, holding all else (growth and risk) constant.
- *Scaling variable:* Young firms often have very little revenues to show in the current year and many will be losing money; the book value is usually meaningless. Applying a multiple to any one of these measures will result in outlandish numbers.
- *Liquidity:* Since equity in publicly traded companies is often more liquid than equity in young growth companies, the value obtained by using these multiples may be too high if applied to a young company.

There are simple practices that can not only prevent egregious pricing valuation errors but also lead to better pricing:

- *Use forward metrics:* Since young firms often have small revenues and negative earnings, one solution is to forecast the operating results of the firm further down the life cycle and use these forward revenues and earnings as the basis for valuation. In effect, we will estimate the value of the business in five years, using revenues or earnings from that point in time.
- Adjust the multiple for the firm's characteristics at the forward period: Consider a simple illustration. Assume that you have a company that is expected to have revenue growth of 50 percent for the next five years and 10 percent thereafter. The multiple that you apply to revenues or earnings in year

five should reflect an expected growth rate of 10 percent (and not 50 percent).

• Adjust for time value and survival risk: When forward multiples are used to derive value, we need to adjust for the time value of money and the likelihood that the firm will not survive to get to the forward value.

Applying these principles to pricing Airbnb, we used two variants of comparable firms, hotels and online booking firms, and two scaling metrics, revenues and gross bookings, in Figure 6.2.

Note that the pricing we attach to Airbnb is higher when we use booking companies as our peer group instead of hotels and if we use forward revenues (and discount back value and adjust for failure) than if we use current revenues. If you are troubled by those variations, they are part and parcel of the pricing process, even though analysts who use pricing often pick the pricing that best suits their biases and agenda. No matter which of these enterprise values you use, you must add back the cash balance (\$4,495 million) and issue proceeds (\$3,000 million), and subtract out its debt (\$2,192 million) to get to equity value.

								Pε	er Gr	ou	ps						
							Largest	US	-based	Н	otel Ch	air	ıs				
		Ma	arket Cap	En	terprise Va	Rei	renues	EB	T .	Nei	t Income	PE		EV/Sales	EV/EBIT		
Marriott		\$	41,620	\$	52,150	\$	20,972	\$	1,938	\$	1,273		32.69	2.49	26.91		
Hilton		\$	28,960	\$	37,530	\$	9,452	\$	1,576	\$	881	Г	32.87	3.97	23.81		
Intercontine	ntal	\$	11,642	\$	13,430	\$	4,627	\$	764	\$	385		30.24	2.90	17.58		
Hyatt		\$	7,439	\$	9,010	\$	5,020	\$	197	\$	766	Г	9.71	1.79	45.74		
Choice Hote	els	\$	5,682	\$	6,600	\$	1,114	\$	334	\$	222		25.59	5.92	19.76		
Wyndham		\$	5,402	\$	7,500	\$	2,053	\$	442	\$	157	Г	34.41	3.65	16.97		
Aggregate		\$	100,745	\$	126,220	\$	43,238	\$	5,251	\$	3,684		27.35	2.92	24.04		
						L	argest U	S-ba	ased Tra	vel	Bookin	g C	ompan	ies			
		м	arket Cap	En	terprise Va	Gro	ss Billings	Re	venues	ΕB	п	Ne	t Income	PE	EV/Gross Billing	EV/Sales	EV/EBIT
Booking.coi	m	\$	84,067	\$	85,530	\$	96,400	\$	15,066	\$	5,345	\$	4,865	17.28	0.89	5.68	16.00
Expedia		\$	17,503	\$	22,480	\$	107,870	S	12,067	\$	961	\$	565	30.98	0.21	1.86	23.39
Aggregate		\$	101,570	\$	108,010	\$	204,270	\$	27,133	\$	6,306	\$	5,430	18.71	0.53	3.98	17.13
							Airbn	h P	ricing Ir	No.	ovembe	r 21	219				
			Usin	a i	Intels as	Pe	ers, Scal										
	Revenue	s			d EV/Sal		1		stimated			Т	Airbnb	Value Toda	y		
Current Year	\$3,625.0	0		2	.92				\$10,58	5		П	\$	10,585	7 —		
Year 5	\$12,066.0	0		2	.92				\$35,23	3			\$	21,088	For	ward value	es from
		Jsi					s as Pee	rs, S	Scaling	to F	Revenue					ar 5 are dis	
	Revenue		Estima		d EV/Sal	es		E.	stimated		/	\perp		Value Toda		k five year	
Current Year					.98				\$14,42					14,428		d adjusted example,	
Year 5	\$12,066.0				.98			_	\$48,02			Д		28,744		ekampie, els:	using
							s Peers,								_ / \/al	ue todav =	(35,233/
	Booking	\rightarrow	Estimate			ng:	S	Е	stimated		V	_		Value Toda		85^5) × 0.9	
Current Year					.53		-		\$14,04			4		14,040	-↓ '		
Year 5	\$90,548.0	0		0	.53				\$47,99	0			\$	28,724			

Figure 6.2 Pricing Airbnb in November 2020

Are We Missing Something?

In both discounted cash flow and relative valuation, we build in our expectations of what success will look like in terms of revenues and earnings. Sometimes, success in one business or market can be a steppingstone to success in other businesses or markets

- Success with an existing product can sometimes provide an opening for a firm to introduce a new product. The success of the iPod laid the foundations for the introduction of the iPhone and the iPad for Apple.
- Companies that succeed with a product in one market may be able to expand into other markets with similar success. The most obvious example of this is expanding into foreign markets to build on domestic market success, a pathway adopted by companies such as Coca Cola, McDonald's, and many retail companies. The subtler examples are products that are directed at one market that serendipitously find new markets: an ulcer drug that reduces cholesterol would be a good example.

Why cannot we build expectations about new products and new markets into our cash flows and value? We can try, but there are two problems. First, our forecasts about these potential product and market extensions will be very hazy at the time of the initial valuation, and the cash flows will reflect this uncertainty. Apple would not have been able to visualize the potential market for the iPhone at the time that they were introducing the iPod. Second, it is the information gleaned and the lessons learned during the initial product launch and subsequent development that allows firms to take full advantage of the follow-up offerings. It is this learning and adaptive behavior that gives rise to value that adds to the estimated intrinsic value.

With Airbnb, an argument for augmenting value can be made, not only based on the size of their platform, in terms of user numbers, but also in the sense that Airbnb has learned about the travel and hospitality tastes of its users that could be used to create new products and services in the future. The question is whether this data is exclusive enough to Airbnb to offer the company a significant advantage.

Value Plays

There are many reasons why young growth companies fail: Revenue growth may lag, target margins may be lower than expected, capital markets may shut down, or key people may leave. Investors can improve their odds of success by focusing on the following:

- *Big potential market:* The potential market for the company's products and services has to be large enough to absorb high revenue growth for an extended period, without being overwhelmed.
- Expense tracking and controls: Young companies can become undisciplined in tracking and controlling expenses while chasing growth. Set targets for margin improvement, and view failure to meet these targets as reasons to sell.
- Access to capital: Capital access is critical to both growth and success. Look for firms with larger cash balances and institutional investor bases because they are better positioned.
- Dependence on key individuals: Young firms are often dependent on key individuals or founders. Focus on firms that have built up a solid bench to back up key personnel.
- Exclusivity: Success will attract competition, often from larger companies with deep pockets. You want young firms that have products that are difficult for others to imitate, whether this exclusivity comes from patents, technology, or brand name. As a bonus, with exclusivity, success is also more likely to feed on

itself, allowing a firm to enter new markets and introduce new products.

In summary, you want to invest in young companies with tough-to-imitate products that have huge potential markets, are working at keeping expenses under control, and have access to capital. Not easy to do, but done right, it is a high-risk, high-return proposition.

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Chapter Seven



Growing Pains: Valuing Growth Companies

IN 2001, GOOGLE (GOOG) was a young start-up, with a few million in revenue and operating losses. Over the following decade, the company saw explosive growth, and in 2009, the company reported operating profits of \$6.5 billion on revenues of \$23.7 billion and had a market value exceeding \$200 billion. Google was still a growth company, but a much larger one. In 2022, Google's operating profits had grown to \$74.8 billion on revenues of \$283 billion, but growth flagged during the year. The two big questions in valuing it, in 2023, were whether it could sustain growth going forward, and how its risk profile has changed and would continue to change in the future.

So, what is a growth company? There are many definitions for growth companies used in practice, but they all tend to be subjective and flawed. Some analysts, for instance, categorize companies as growth companies or mature companies, based on the sectors that they operate in. Thus, technology companies in the United States are treated as growth companies, whereas steel companies are considered mature. This definition clearly misses the vast differences in growth prospects across companies within any given sector. Others categorize companies trading at high PE ratios as growth companies, trusting markets to make the distinction. Here is an alternative definition: growth firms get more of their value from investments that they expect to make in the future and less from investments already made. While this may seem like a restatement of the growth categorization described earlier, where firms with high growth rates are treated as growth

companies, there is an important difference. The value of growth assets is a function of not only how much growth is anticipated but also the quality of that growth, measured in terms of excess returns: returns on the invested capital in these assets, relative to the cost of capital.

Growth companies are diverse in size and growth prospects, but they share some common characteristics:

- *Dynamic financials:* Not only can the earnings and book value numbers for the latest year be very different from numbers in the prior year, but they can change dramatically even over shorter time periods.
- Market-Accounting disconnect: The market values of growth companies, if they are publicly traded, are often much higher than the book values, since markets incorporate the value of growth assets, and accountants do not. In addition, the market values can seem discordant with the operating numbers for the firm—revenues and earnings. Many growth firms have market values in the billions, while reporting small revenues and negative earnings.
- *Use of debt:* Growth firms in any business will tend to carry less debt, relative to their value (intrinsic or market), than more stable firms in the same business, simply because they do not have the cash flows from existing assets to support more debt.
- Market history is short and unstable: Even if growth companies are publicly traded, they generally have stock price data going back for short periods, and even that data is unstable.

The degree to which these factors affect growth firms can vary across firms, but they are prevalent in almost every growth firm. While growth companies can emerge in any business, it is true that many of the fastest growth companies of the last few decades have been technology and service companies. While these companies are diverse, there is one characteristic that they share, which is that they derive their value from intangible assets. From a valuation perspective, that does not matter, since value comes from expected cash flows, not whether an asset is tangible or not. The problem,

though, is that the accounting for intangible assets is not consistent with its treatment of physical assets. Accounting first principles suggests a simple rule to separate capital expenses from operating expenses. Any expense that creates benefits over many years is a capital expense, whereas expenses that generate benefits only in the current year are operating expenses. Accountants hew to this distinction with manufacturing firms, putting investments in plant, equipment, and buildings in the capital expense column and labor and raw material expenses in the operating expense column. However, they seem to ignore these first principles when it comes to firms with intangible assets. The most significant capital expenditures made by technology and pharmaceutical firms is in R&D, by consumer product companies in brand name advertising, and by consulting firms in training and recruiting personnel. Using the argument that the benefits are too uncertain, accountants have treated these expenses as operating expenses. Consequently, firms with intangible assets report small capital expenditures, relative to both their size and growth potential.

Valuation Issues

The shared characteristics of growth firms—dynamic financials, a mix of public and private equity, disconnects between market value and operating data, a dependence on equity funding, and a short and volatile market history—have consequences for both intrinsic and relative valuations.

If the intrinsic value of a company comes from its cash flows and risk characteristics, there are problems that can be traced back to where growth firms are in the life cycle. The biggest challenge that we face in valuing growth companies stems from changing scale. Even in the most successful growth company, we can expect future growth to be lower than past growth for two reasons. One is that a company that has posted a growth rate of 80 percent over the last five years is larger (by a factor of 18) than it was five years ago, and it is unlikely to maintain that growth rate. The other is that growth attracts competition which, in turn, crimps growth. Questions about how quickly growth rates will scale down going forward, and how the risk and other characteristics of the firm will

change as growth changes, are at the center of growth company valuation.

The issues that make discounted cash flow valuation difficult also crop up, not surprisingly, when we try to price these companies.

- Comparable firms: Even if all of the companies in a sector are growth firms, they can vary widely in terms of risk and growth characteristics, thus making it difficult to generalize from industry averages.
- Base year values and choice of multiples: If a firm is a growth firm, the current values for scaling variables such as earnings, book value, or revenues may provide limited or unreliable clues to the future potential for the firm.
- Controlling for growth differences: Not only does the level of growth make a difference to value, but so does the length of the growth period and the excess returns that accompany that growth rate. Put another way, two companies with the same expected growth rate in earnings can trade at very different multiples of these earnings.
- Controlling for risk differences: Determining how the trade-off between growth and risk will affect value is difficult to do in any valuation but becomes doubly so in relative valuation, where many companies have both high growth and high risk.

Analysts who use multiples to value growth firms may feel a false sense of security about their valuations since their assumptions are often implicit rather than explicit. The reality, though, is that relative valuations yield valuations that are just as subject to error as discounted cash flow valuations.

Valuation Solutions

While growth companies raise thorny estimation problems, we can navigate our way through these problems to arrive at values for these firms that are less likely to be contaminated by internal inconsistencies.

Intrinsic Valuation

The discounted cash flow models used to value growth companies need to allow for changing growth and margins over time. Rigid models that lock in the current characteristics of the company do not perform as well as more flexible models, where analysts can change the inputs, in valuing growth companies. To illustrate the process, we will value Google, a search engine that has become an advertising juggernaut, delivering huge profits on growing revenues, over the last decade. Between 2012 and 2022 the company increased revenues from \$46 billion to \$289.5 billion, representing a compounded annual growth rate of 20.2%. During the period, Google renamed itself Alphabet, with the intent of sending a message to markets about the other businesses (bets) that the company was in, though those businesses have added little to either the top or bottom line for the company.

Cleaning up for Accounting Inconsistencies Research expenses, notwithstanding the uncertainty about future benefits, should be capitalized, and we will illustrate the effects of doing so with Google. To capitalize and value research assets, we have to make an assumption about how long it takes for research and development to be converted, on average, into commercial products. This is called the *amortizable life* of these assets. This life will vary across firms and reflect the commercial life of the products that emerge from the research. While this amortizable life can be as long as a decade for pharmaceutical companies, the payoff to research is likely to be sooner with a company such as Google, where we will assume three years.

Table 7.1 R&D Amortization in \$ millions: Google in 2023

Year	R&D expense	Unamort portion	ize A mortizat this vear	ion
Most recen	1	1.00	\$42,596	
Year –1	\$39,500	0.67	\$26,333	\$13,167

Year –2	\$31,562	0.33	\$10,521	\$10,521
Year –3	\$27,573	0.00	\$0	\$9,191
			\$79,450	\$32,878

Once the amortizable life of research and development expenses has been estimated, the next step is to collect data on R&D expenses over past years ranging back to the amortizable life of the research asset. With Google, that calculation will yield the numbers in Table 7.1:

For simplicity, it can be assumed that the amortization is uniform over time, and in the case of the research asset with a three-year life, you assume that you amortize one-third of the amortization expense each year to get the cumulated amortization expense for the current year of \$32,878 million. Cumulating the unamortized portion of the expenses from prior years yields the capital invested in the research asset of \$79,450 million. This augments the value of the assets of the firm, and by extension, the book value (BV) of equity. For Google:

```
Adjusted BV of equity = BV of equity + Capital invested in R&D = $256,144 \text{ million} + $79,450 \text{ million} = $335,594 \text{ million}.
```

Adjusted invested capital = BV of invested capital +Capital invested in R&D = \$236,533 million +\$79,450 million = \$315,983 million.

The reported accounting income is adjusted to reflect the capitalization of R&D expenses. First, the R&D expenses that were subtracted out to arrive at the operating income are added back to the operating income, reflecting their re-categorization as capital expenses. Next, the amortization of the research asset is treated the same way that depreciation is and netted out to arrive at the adjusted operating income and adjusted net income. *Using Google to illustrate this process:*

Adjusted operating income

- = Operating income + R&D expenses R&D amortization
- = 74,842 + 42,596 32,878 = \$84,560 million.

Adjusted net income

- = Net income + R&D expenses R&D amortization
- = 59,972 + 42,596 32,878 = \$69,690 million.

The adjusted operating and net income will generally increase for firms that have R&D expenses that are growing over time.

Table 7.2 Effects of Capitalizing Research Expenses: Alphabet

	Unadjusted	Adjusted for R&D
Net margin	59,972 = 21.20%	69,690 = 24.64%
Operating margin	$\frac{74,842}{282,836} = 26.46\%$	$\frac{84,560}{282,836} = 29.90\%$
Return on equity	59,972 = 23.41%	69,690 = 20.77%
Pretax return on capital	256,144 74,842 = 31.64% 236,533	$\frac{84,560}{315,983} = 26.76\%$

The book values of both equity and capital are augmented by the capital invested in the research asset. For Google, using these augmented book values, with the adjusted income, yields very different estimates for profitability measures, as shown in Table 7.2.

While the accounting returns for Google remain impressive even after the adjustment, they decline from the unadjusted numbers, but the company's margins improve.

R&D expenses are the most prominent example of capital expenses being treated as operating expenses, but there are other operating expenses that arguably should be treated as capital expenses. Consumer product companies such as Procter & Gamble (PG) and Coca Cola (KO) could make a case that a portion of advertising expenses should be treated as capital expenses, since they are designed to augment brand name value. For a consulting firm such as KPMG or McKinsey, the cost of recruiting and training its employees could be considered a capital expense, since the consultants who emerge are likely to be the heart of the firm's assets and provide benefits over many years. For user-based firms, such as Uber and Netflix, the cost of acquiring new users and subscribers should also be considered as a capital expense.

Valuing the Operating Assets The valuation process starts with estimating future revenues. The biggest issue is the scaling factor. The question of how quickly revenue growth rates will decline at a given company, as it gets bigger, can generally be addressed by looking at the company's specifics—the size of the overall market for its products and services, the strength of the competition, and the quality of both its products and management. Companies with larger potential markets with less aggressive competition and better management can maintain high revenue growth rates for longer periods. Alphabet has had an impressive run of high growth, but the online advertising business has matured, and Alphabet's large market share implies that future growth will be much lower. We will assume single-digit growth, albeit in the high single digits at 8%, for the next five years, before lowering revenue growth down to stable growth in the following years, with the cloud business contributing to a portion of this growth. Implicit in this story is the assumption that Alphabet's other bets will continue to limp along, delivering little of substance to either the top line or the bottom line.

VALUE DRIVER #1: SCALABLE GROWTH

The faster you grow, the larger you get. The larger you get, the more difficult it is to keep growing. How good is your firm at scaling up growth?

To get from revenues to operating income, we need operating margins over time, and operating margins in the future will be different from current margins. In some growth firms, the current operating margin will be either negative or very low, largely because up-front fixed costs associated with infrastructure as well as selling expenses directed toward getting new clients (and future growth) are counted in the current year's expenses. As the company grows, margins should improve. Conversely, some

growth companies enjoy super-high margins because they have niche products in markets too small to attract the attention of larger, better-capitalized competitors. As the firm grows, this may change, and margins could decrease as competitors emerge.

In both scenarios—low margins converging to a higher value, or high margins dropping back to more sustainable levels—we must make judgment calls on what the target margin should be and how the current margin will change over time toward this target. The answer to the first question can usually be found by looking at both the average operating margins commanded by larger, more stable firms in that industry. The answer to the second will depend on the reason for the divergence between the current and the target margin. With infrastructure companies, for instance, it will reflect how long it will take for the investment to be operational and capacity to be fully utilized.

On this front, Alphabet is well positioned in its core business, where it has strong networking benefits, i.e. online advertisers will continue to go to the platforms with the most users, and we believe that operating margins will stay stable and perhaps even rise, as the company reins in costs, especially in the businesses (bets) that are slow to show results. We will assume that the current operating margin of 30% will rise slightly over time, to reach 32% in year 5, especially as the company trims costs.

In keeping with the theme that firms must reinvest to grow, we will follow one of three paths to estimate reinvestment. The first and most general approach is to estimate the reinvestment using the change in revenue and a sales-to-capital ratio, estimated using either historical data for the firm or industry averages. Thus, assuming a sales-to-capital ratio of 2.5, in conjunction with a revenue increase of \$250 million, will result in reinvestment of \$100 million. For growth firms that have a more established record of earnings and reinvestment, we can estimate the growth rate as a product of the reinvestment rate and the return on capital on these investments. Finally, growth firms that have already invested in capacity for future years are in the unusual position of being able to grow with little or no reinvestment for the near term. For these firms, we can forecast capacity usage to determine how long the investment holiday will last and when the firm will have to reinvest again. For Alphabet, we use the first approach, and use the global industry-average sales-to-capital ratio of 3.09, reflecting the low capital intensity of the business to estimate reinvestment each year. The resulting free cash flows to the firm are summarized in Table 7.3.

VALUE DRIVER #2: SUSTAINABLE MARGINS

Success attracts competition, and competition can hurt margins. How strong is your company's competitive edge?

To get the reinvestment in year 1, we use the change in revenues from year 1 to year 2 (\$329,900 - \$305,363 = \$24,437) and divide that change by the sales-to-capital ratio of 3.09, to arrive at a reinvestment of \$7,908 million.

VALUE DRIVER #3: QUALITY GROWTH

Growth has value only if accompanied by excess returns. Do you see your firm generating returns significantly higher than its cost of funding?

Table 7.3 Expected Free Cash Flows to Firm for Alphabet

Year	O RETURNATION
Last	\$282,83@9.90%\$84,560
year	
1	8.00\$305,4630.00\$91,6395.92\$77,049\$7,90\$69,141
2	8.00\$329,9000.80\$401,6095.92\$85,432\$8,54\$76,891
3	8.00\$356,29231.20\$11,1635.92\$93,465\$9,22\$84,241

4	8.00\$384,7	931.608/121,5	59:15.925/102,2	36\$9,96 \$ 92,274
5				13\$9,6 \$3 02,130
6	7.20\$445,5	60 B2.00% 42,5	66(17.74\$%17,2	75\$9,2 \$7 08,048
7	6.40\$474,0	01332.0087451,6	584 1 9.5 5\$ 7622,0	26\$8,5 9 113,436
8	5.60\$\$500,5	5 <i>5′</i> 32.00\$⁄160,1	7221.375/125,9	51 \$7,7\$618,175
9	4.80\$\$524,5	58 -3 2.00 % 167,8	36°23.18\$%128,9	48 \$ 6,7 \$ 122,158
10	4.00\$545,5	6632.00\$174,5	8225.00\$1130,9	36 \$7,0\$223,874
Termi	n 4 100\$ 5 67,3	39 032 .00 \$% 81,5	66 :2 5.00\$\dds36,1	7 \$ 36,31 \$ 99,861
year	1			

Risk Profile Consistent with Growth and Operating Numbers While the components of the cost of capital are the same for a growth company as they are for a mature company, what sets growth companies apart is that their risk profiles will shift over time. As general rules:

- Growth firms should have high costs for equity and debt when revenue growth is highest, but the costs of debt and equity should decline as revenue growth moderates and margins improve.
- As earnings increase and growth drops, the firm will generate
 more cash flows than it needs, which it can use not only to
 pay dividends but also to service debt. While firms are not
 required to use this debt capacity, the tax advantages of debt
 will lead some firms to borrow, causing debt ratios to increase
 over time.

In terms of estimating risk parameters (betas), steer as far as you can from using the limited price data that is available on growth companies; the estimation error is likely to be huge, and the company's characteristics will change over time. Instead, use estimates of betas obtained by looking at other publicly traded firms that share the same risk, growth, and cash flow characteristics as the firm being valued. With Alphabet, the beta of 1.16 in the high growth phase reflects the businesses (online advertising and cloud) that it derives its revenues from, and an equity risk premium of 6.31% reflects the parts of the world that

this revenue comes from. Given its bond rating of Aa2, Alphabet has a low cost of debt (4.80%), though it gets less than one percent of its capital from debt.

Cost of equity for Alphabet =
$$4\% + 1.16(6.31\%) = 11.33\%$$
.

Cost of debt (after taxes) for Alphabet =
$$(4\% + 0.8\%)(1-0.25)$$

= 3.60%.

Cost of Capital for Alphabet =
$$11.33\% (0.992) + 3.60\% (0.008)$$

= 11.27% .

Over time, we expect Alphabet's cost of capital to drift down toward the average cost of capital for all firms, at 9%.

When and What Will the Firm Look Like? The assumptions we make about terminal value loom large with a growth company, since it will constitute a much larger portion of the firm's current value than is the case with a mature firm. Assessing when a growth firm will become a stable company is difficult to do, but keep in mind the following general propositions:

VALUE DRIVER #4: RISK ASSOCIATED WITH OPERATIONS

The value of a company is a function of the risk in its cash flows. How risky is your firm, and what do you expect to see happen to its cost of capital?

 Do not wait too long to put a firm into stable growth. Both scale and competition conspire to lower growth rates quickly at even the most promising growth companies. With Alphabet, the 10-year growth period assumed reflects optimism about the company's growth prospects and competitive advantages; after year 10, the growth rate is assumed to be 8 percent.

• When you put your firm into stable growth, give it the characteristics of a stable growth firm: With discount rates, as we noted in the last section, this will take the form of using lower costs of debt and equity and a higher debt ratio. With reinvestment, the key assumption will be the return on capital that we assume for the stable growth phase.

Reinvestment rate in stable growth

While some analysts believe that the return on capital should be set equal to the cost of capital in stable growth, we would preserve some company-specific flexibility and suggest that the difference between return on capital and cost of capital should narrow during stable growth to a sustainable level. The networking benefits in Alphabet's advertising business are assumed to give the company a long-term advantage, translating into a return on invested capital of 15 percent after year 10, in perpetuity. The resulting reinvestment rate and terminal value are reported here.

$$\begin{aligned} \text{Reinvestment rate} &= \frac{4.00\%}{15.00\%} = 26.67\%. \\ &= \frac{\text{EBIT} \left(1 - t\right) \text{in terminal year}}{\left(1 - \text{Reinvestment rate}_{\text{Stable}}\right)} \\ &= \frac{\left(1 - \text{Reinvestment rate}_{\text{Stable}}\right)}{\left(\text{Cost of capital} - \text{Stable growth rate}\right)} \\ &= \frac{136,174 \left(1 - 0.2667\right)}{\left(0.09 - 0.04\right)} = \$1,997,213 \text{ million.} \end{aligned}$$

Table 7.4 Value of Operating Assets for Alphabet

Year	(Thurs		A iidas milki	
1	11.27%	1.1127	\$69,14	\$62,138
2	11.27%	1.2381	\$76,891	\$62,104
3	11.27%	1.3776	\$84,241	\$61,149
4	11.27%	1.5329	\$92,274	\$60,196

5	11.27%	1.7057 \$102,130	\$59,877
6	10.72%	1.8885 \$108,048	\$57,213
7	10.36%	2.084 \$113,436	\$54,428
8	9.91%	2.2907 \$118,175	\$51,589
9	9.45%	2.5072 \$122,158	\$48,724
10	9.00%	2.7328 \$123,874\$1,997	,213\$776,159
			\$1,293,577

Discounting the cash flows over the next 10 years (from Table 5.1) at the time-varying costs of capital and including the present value of the terminal value yields a value of operating assets for Alphabet of \$1.293 trillion, as shown in Table 7.4.

From Operating Asset Value to Equity Value per Share As with young growth firms, to get from operating asset value to equity value per share, we add back the cash balance at the company, subtract out debt outstanding, and subtract out management options, before dividing by the number of shares outstanding. For Alphabet, which has \$113,762 million as a cash balance, \$30,492 million in non-operating assets, and owes \$14,701 million in debt, the value of equity is \$1,422,130 million. As with young growth firms, to get from operating asset value to equity value per share, we add back the cash balance at the company, subtract out debt outstanding, and subtract out management options, before dividing by the number of shares outstanding. The company does not have options outstanding, but we include restricted shares granted to employees in the number of shares outstanding (12,610 million) to arrive at a value per share of \$112.79.

Value per share =
$$\frac{(\$1,293,577+\$113,762+\$30,492-\$14,701)}{12,610}$$
=\\$112.79.

This estimate assumes that the shares are all equivalent on dividend and voting rights. Some growth firms continue to be controlled by their founder, who maintains control by holding on to shares with disproportionate voting rights. If that is the case, you must adjust for the fact that voting shares trade at a premium

over nonvoting shares; studies indicate that the premium is about 5 to 10 percent at US companies. Alphabet has three classes of shares, with class A shares having one voting right per share, class B shares ten voting rights, and class C shares having no voting rights. Since class C shares are the ones that are most widely traded, you would expect these shares to trade at a discount on the estimated value of \$112.79. At the market price of \$131 on the date of this valuation (August 8, 2023), the stocks look overvalued.

Relative Valuation (Pricing)

Analysts valuing growth companies tend to use either revenue multiples or forward earnings multiples. Each carries some danger. Revenue multiples are troubling simply because they gloss over the fact that the company being valued could be losing significant amounts of money. Consequently, we would suggest bringing the expected future profit margins into the discussion of what constitutes a reasonable multiple of revenues. Forward earnings multiples implicitly assume that the firm being valued will survive to the forward year and that the estimates of earnings for that year are reasonable.

With growth firms, no matter how careful you are about constructing a set of comparable firms and picking the right multiple, there will be significant differences across the firms on both the level and the quality of expected growth, and all three ways described in Chapter 4 can be used to control for differences.

- 1. *The story:* When comparing the pricing of growth firms, analysts often try to explain why a company trades at a higher multiple than comparable firms by pointing to its higher growth potential. In 2023, for instance, Alphabet traded at a PE ratio of 27.74, the median for the online advertising sector. Analysts are expecting earnings per share growth of 17.30%, slightly higher than the median of 15.80% for the peer group, making Alphabet close to fairly priced, or perhaps even mildly underpriced.
- 2. Adjusted multiples: In the PEG ratio, the PE ratio is divided

by expected growth in the future, to estimate a growth-adjusted version of the PE ratio. In effect, a firm that trades at a lower PEG ratio is cheaper than one that trades at a higher PEG ratio. Alphabet's PEG ratio of just about 1.6 (27.74/17.30) is at the median for the industry, again suggesting a fair pricing.

3. Statistical approaches: When firms vary not only on expected growth but also on the quality of that growth and risk, the first two approaches become difficult to apply. A multiple regression, with the multiple as the dependent variable, and risk and growth as independent variables, allows us to control for differences across firms on these dimensions. Regressing PE ratios against expected growth and beta for firms in the technology sector, we obtain:

$$PE = 24.76 + 85.04$$
 (Expected growth rate), $R^2 = 19.3\%$.

Plugging Alphabet's growth rate (17.3%) into this regression:

PE for Alphabet =
$$24.76 + 85.04(0.173) = 39.47$$
.

At its existing PE ratio of 27.74, Alphabet looks underpriced. This is at odds with the intrinsic valuation of the company, where the conclusion was that it was overvalued. There are lessons for investors in both conclusions. Long-term investors can draw comfort from the intrinsic valuation, but they should be ready for short-term turbulence, because of the pricing.

Value Plays

For a growth company to succeed, it has to scale up growth while preserving profit margins. Expected revenue growth rates will tend to drop over time for all growth companies, but the pace of the drop will vary across companies. For investing in growth companies to pay off, here are a few things to look for.

- Scalable growth: As a firm becomes larger, growth rates will decline. Focus on firms that are able to diversify their product offerings and cater to a wider customer base as they grow. They will see more growth even as they scale up than firms that do not have this capability.
- Sustainable margins: As firms become successful, there will be increased competition. Look for firms that are able to preserve profit margins and returns as they grow and steer away from firms that have to trade off lower margins and returns for higher growth.
- *The right price*: Great growth companies can be bad investments at the wrong price. While multiples such as PEG ratios have their limitations, use them (low PEG ratios) to screen for companies that are cheap.

Time can be your ally. Even the most worthy growth company will disappoint investors at some point, delivering earnings that do not match up to lofty expectations. When that happens, there will be investors who overreact, dumping their shares, and embarking on their search for the next great growth story. The drop in price will offer you an opportunity to pick up the company at the right price.

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Chapter Eight



Valuation Viagra: Valuing Mature Companies

MATURE COMPANIES SUCH AS COCA COLA (KO), Unilever (UL), and General Electric (GE) have been around for generations. They should be easy to value, since they have long periods of operating and market history, with established patterns of investment and financing. But not all long-standing practice is good, and it is possible that changing the way these companies are run can make a difference in value. Coca Cola might be more valuable if it used more debt funding, and Unilever's value might increase if some of its divisions were spun off as separate entities.

If growth companies get the bulk of their value from growth assets, mature companies must get the bulk of their value from existing investments. If we define mature companies thus, the threshold for being a mature company will vary across markets and across time (the threshold will be higher when economies slow down, as they did in 2008 and 2009, and lower when economies are booming).

The common characteristics of mature companies are:

- Revenue growth is approaching growth rate in the economy: While the growth rate for earnings for mature firms can be high, at least in some years, mature firms will register growth rates in revenues that, if not equal to, will converge on the nominal growth rate for the economy.
- *Margins are established:* Mature companies tend to have stable margins, with the exceptions being commodity and

cyclical firms, where margins will vary as a function of macroeconomic variables.

- *Diverse competitive advantages:* While some mature firms see excess returns go to zero or become negative, other mature firms retain significant competitive advantages (and excess returns). For instance, Coca Cola uses its brand name to continue to deliver high returns.
- *Debt capacity:* With more cash available for servicing debt, debt capacity should increase for mature firms, though there can be big differences in how firms react to this surge in debt capacity. Some will choose not to exploit any or most of the debt capacity and stick with financing policies that they established as growth companies.
- Cash build-up and return: As earnings improve and reinvestment needs drop off, mature companies will be generating more cash from their operations than they need. If these companies do not pay more dividends, cash balances will start accumulating in these firms.
- Acquisition-driven growth: As companies get larger and investment opportunities internally do not provide the growth boost that they are used to, one quick fix used by these firms is to buy growth: acquisitions of other companies can provide boosts to revenues and earnings.

Not all mature companies are large companies. Many small companies reach their growth ceiling quickly and essentially stay on as small mature firms.

Valuation Issues

When valuing mature companies, investors are often lulled into believing that the numbers from the past (operating margins, returns on capital) are reasonable estimates of what existing assets will continue to generate in the future. However, past earnings reflect how the firm was managed over the period. To the extent that managers may not have made the right investment or financing choices, the reported earnings may be lower than what

would be generated under better management. If such a management change is on the horizon, investors will undervalue existing assets using reported numbers. A secondary challenge is that mature companies are more likely to turn to acquisitions for growth. As a general rule, the value of acquisition-driven growth is much more difficult to assess than the value of internal or organic growth.

With mature companies, you have a luxury of riches when it comes to pricing. You can estimate revenues, earnings, and book value multiples and compare how a company is priced relative to other companies like it, but challenges remain.

- *Too many choices:* The same company can be assigned very different values, depending on whether we are using a firm or equity multiple, whether that multiple is stated as a function of revenues, earnings, or book value, and the companies we pick to be its comparable firms. With mature firms, the problem we face is not that we cannot estimate a relative value but that there are too many values to pick from.
- *Management change*: The multiples that we compute of revenues, earnings, and book value reflect the firm as it is managed today. To the extent that changing the management of the firm could change these numbers, we will undervalue badly managed firms with current numbers.
- Acquisition noise: The accounting aftermath of acquisitions
 —the creation of goodwill as an asset and its subsequent
 treatment—can affect both earnings and book value, making
 multiples based on either number dicey.
- Changing financial leverage: Mature companies are capable of making large changes to their debt ratios overnight—debt for equity swaps, recapitalizations—and equity multiples, such as PE and price-to-book ratios, will change more as financial leverage changes than enterprise value or firm multiples. A stock buyback, funded with debt, can reduce equity dramatically (by reducing the shares outstanding) but will have a much smaller impact on enterprise value (since we are replacing equity with debt). For the same reason, equity earnings (earnings per share, net income) will change when firms alter debt ratios.

Valuation Solutions

If the key to valuing mature companies is assessing the potential increase in value from changing the way they are run, these changes can be categorized broadly into three groups: changes in operations, changes in financial structure, and changes in nonoperating assets.

Operating Restructuring

When valuing a company, our forecasts of earnings and cash flows are built on assumptions about how the company will be run. The value of the operating assets of the firm is a function of three variables—cash flows from assets in place, expected growth, and the length of the growth period—and each can be altered by management policies.

- Cash flow from existing assets: If existing investments are being operated inefficiently, cutting costs and improving employee productivity or redeploying assets to new uses can increase cash flows.
- Expected growth rate: Firms can increase their long-term growth by either reinvesting more (higher reinvestment rate) or reinvesting better (higher return on capital). They can also improve returns on existing assets to generate short-term efficiency growth. For some mature firms with low returns on capital (especially when returns are less than the cost of capital), it is possible, perhaps even likely, that value will increase when these firms reinvest less and settle for lower growth in the future.
- Length of the high growth period: The longer a firm can maintain high growth and excess returns, the higher will be its value. One way firms can increase value is by augmenting existing barriers to entry and coming up with new competitive advantages.

Financial Restructuring

Two aspects of financing affect the cost of capital and through it, the value that we derive for a firm. First, we will look at how changes in the mix of debt and equity used to fund operations affect the cost of capital. Second, we will look at how the choices of financing (in terms of seniority, maturity, currency, and other features) may affect the cost of funding and value.

VALUE DRIVER #1: OPERATING SLACK

Improving your stewardship of assets can generate large payoffs. What is the scope for improvements in your firm's operations?

The trade-off between debt and equity is simple. Interest expenses are tax deductible and cash flows to equity are not, making debt more attractive, relative to equity, as the marginal tax rate rises. Debt can also operate as a disciplinary mechanism on managers in mature firms; managers are less likely to make bad investments if they must make interest expenses each period. On the other side of the ledger, debt has three disadvantages. The first is an expected bankruptcy cost, since as debt increases, so does the probability of bankruptcy. But what is the cost of bankruptcy? One is the direct cost of going bankrupt, such as legal fees and court costs, which can eat up a significant portion of the value of a bankrupt firm. The more devastating cost is the effect of being perceived as being in financial trouble: customers may stop buying your products, suppliers may demand cash for goods, and employees may abandon ship, creating a downward spiral for the firm that can destroy it. The second is an agency cost, arising from different and competing interests of equity investors and lenders in a firm. Equity investors see more upside from risky investments than lenders do. As lenders become aware of this conflict of interest, they protect themselves by either writing covenants into loan agreements or charging higher interest rates. Putting this trade-off

into practice requires us to try to quantify both the costs and benefits of debt.

In the cost of capital approach, the optimal financing mix is the one that minimizes a company's cost of capital. Replacing equity with debt has the positive effect of replacing a more expensive mode of funding (equity) with a less expensive one (debt), but in the process the increased risk in both debt and equity will push up the costs of both components. The cost of capital approach relies on sustainable cash flow to determine the optimal debt ratio. The more stable and predictable a company's cash flow and the greater the magnitude of these cash flows—as a percentage of enterprise value—the higher the company's optimal debt ratio can be. Furthermore, the most significant benefit of debt is the tax benefit. Higher tax rates should lead to higher debt ratios.

To illustrate this process, we look at Unilever's cost of capital, as a function of changing debt ratios, in August 2023. Unilever's debt ratio at the time was 16.84 percent, with a cost of capital of 9.91%. Using the cost of capital approach in Table 8.1 yields an optimal debt ratio of around 30 percent debt, with cost of capital minimized at 9.88%, for Unilever in August 2023.

Table 8.1 Cost of Capital and Debt Ratios for Unilever

Debt ratio	Co syBt@q ui	t©ost of
		debt (after tax)
0%	100.1989%	
10%	19 09:018 %	
16.84%	1941 920165%	
20%	1911 920187%	
30%	19 21 S IKI99 %	
40%	101.680%	
50%	14.68%	
60%	162.903%	
70%	282.3794%	
80%	30LA97%	
90%	36.23%	

The beta and cost of equity for Unilever rise as the debt ratio

increases. The after-tax cost of debt also rises as the higher debt ratio increases default risk, and the tax benefits fade as debt ratios become higher than 50 percent. Note also that the savings from moving from the current debt ratio to the optimal results in only a trivial decline in the cost of capital.

VALUE DRIVER #2: FINANCIAL SLACK

Changing the mix of debt and equity and the type of debt can change value. Does your firm have the right mix of debt and equity?

Firms that mismatch cash flows on debt and cash flows on assets (by using short-term debt to finance long-term assets, debt in one currency to finance assets in a different currency, or floating rate debt to finance assets whose cash flows tend to be adversely affected by higher inflation) will end up with higher default risk, higher costs of capital, and lower firm values. Companies often use a bewildering array of debt and justify this complexity on the basis of cheapness, defined purely in terms of interest payments. If firms can reduce debt/asset mismatches, default risk can be decreased and firm value can be increased.

Nonoperating Assets

A significant chunk of a firm's value comes from its nonoperating assets—cash and marketable securities and holdings in other companies. While cash and marketable securities are by themselves neutral investments, earning a fair rate of return (a low one but a fair one given the risk and liquidity of the investments), there are two scenarios where a large cash balance can be value destructive. The first is when cash is invested at below market rates. A firm with \$2 billion in a cash balance held in a non-interest-bearing checking account is clearly hurting its stockholders. The second arises if investors are concerned that

cash will be misused by management. In either case, investors will discount cash; a dollar in cash will be valued at less than a dollar. Returning cash to stockholders in the form of dividends or stock buybacks will make stockholders better off.

Firms with substantial cross-holdings in diverse businesses may find these holdings being undervalued by the market. In some cases, this undervaluation can be blamed on information gaps, caused by the failure to convey important details on growth, risk, and cash flows on cross-holdings to the markets. In other cases, it may reflect market skepticism about the parent company's capacity to manage its cross-holding portfolio; consider this a conglomerate discount. If such a discount applies, the prescription for increased value is simple. Spinning off or divesting the cross-holdings and thus exposing their true value should make stockholders in the parent company better off.

Can Changing Management Change Value?

To examine the interaction between management and value, first examine the effects of changing management on value, and then the likelihood that change will happen. If we estimate a value for the firm, assuming that existing management practices continue, and call this a status quo value and reestimate the value of the same firm, assuming that it is optimally managed, and call this the optimal value, the value of changing management can be written as:

Value of management change

= Optimal firm value – Status quo value.

The value of changing management will be zero in a firm that is already optimally managed and substantial for a firm that is badly managed. Suboptimal management can manifest itself in different ways for different firms, and the pathway to value creation will vary across firms. For firms where existing assets are poorly managed, the increase in value will be primarily from managing those assets more efficiently—higher cash flows from these assets and efficiency growth. For firms where investment policy is sound

but financing policy is not, the increase in value will come from changing the mix of debt and equity and a lower cost of capital. For Unilever, consider two valuations for the company: The existing management of the company has preserved the status quo, delivering low growth with stable margins for the last decade. It has also chosen to have less debt (16.84 percent debt ratio) relative to its optimal debt ratio of about 30 percent. Valuing the company under the status quo yields a value of 42.44 euros a share. A new management in place that is willing to prune its flagging brands can improve margins to 20% while holding on to growth and financing policies (higher debt ratio of 30 percent) generates a value of 49.05 euros per share. Thus, the overall value of control is 6.61 euros/share at the company.

There is a strong bias toward preserving incumbent management at firms, even when there is widespread agreement that the management is incompetent or does not have stockholder interests at heart. This bias can be traced to legal restrictions on takeovers, institutional constraints on raising capital to challenge managers, anti-takeover or control clauses in corporate charters, shares with different voting rights, and complex cross-holding structures. Notwithstanding these barriers to action, there are companies where the top management is replaced either internally (by the board and stockholders) or externally (through acquisitions). Often, these changes are triggered by activist investors, who can challenge and, in some cases, replace managers. If you take a closer look at these firms, you will notice that management change is more likely to occur at firms with poor stock price and earnings performance, small and independent boards of directors, high institutional (and low insider) stockholdings, and that operate in competitive sectors.

VALUE DRIVER #3: PROBABILITY OF MANAGEMENT CHANGE

For value to change, management has to change. What is the likelihood of management change at your firm?

Activist investors have targeted Unilever during the last decade, pushing for cost cuts, a pruning of brand names, and fewer acquisitions. In fact, Unilever has seen change at the top as a consequence, and it is likely that more change is on the horizon.

Assume that you live in a world where management change never happens and that the market is reasonably efficient about assessing the values of the firms that it prices. In this scenario, every company will trade at its status quo value, reflecting both the strengths and weaknesses of existing management. Now assume that you introduce the likelihood of management change into this market, either in the form of hostile acquisitions or CEO changes. If you define the value of the company under existing management as the status quo value and under new management as the optimal value, the stock price of every firm should be a weighted average:

Market value = Status quo value + (Optimal value - Status quo value) × Probability of management changing.

The degree to which this will affect stock prices will vary widely across firms and markets, with the expected value of control being greatest for badly managed firms where there is a high likelihood of management turnover and in markets where corporate governance is stronger.

To the extent that the expected value of control is already built into the market value, anything that causes market perception of the likelihood of management change to shift can have large effects on all stocks. A hostile acquisition of one company, for instance, may lead investors to change their assessments of the likelihood of management change for all companies in the sector and to an increase in stock prices. If you define corporate governance as the power to change the management of badly managed companies, stock prices in a market where corporate governance is effective will reflect a high likelihood of change for bad management and a higher expected value for control. In contrast, it is difficult, if not impossible, to dislodge managers in markets where corporate governance is weak. Stock prices in these markets will therefore incorporate lower expected values for control. The differences in corporate governance are likely to manifest themselves most in the worst-managed firms in the market.

Earlier, we estimated two values for Unilever: 42.44 euros/share with existing management (status quo value) and 49.05 euros with more aggressive managers in place (optimal value), and a probability of 60 percent that management will change. The resulting value is:

Expected Value per share =
$$42.44(0.40) + 49.05(0.60)$$

= $46.41 \text{ euros/share}$.

The actual market price at the time of this valuation was about 52.26 euros per share. Note that while it is much higher than the status quo value of 42.44 Euros/share, the fairer comparison is to the expected value, and it remains overvalued, albeit less so.

Value Plays

There are two value plays with mature companies. The first is the classic "passive value" strategy that traces its roots to Ben Graham and Warren Buffett, where you invest in well-managed companies that deliver solid earnings and reasonable growth, but that investors have turned sour on, either in reaction to a recent news event (earnings report) or because these firms are not the flavor of the moment or are boring.

Another way to profit from these companies—and this is a more perverse strategy—is to look for those firms that are poorly managed but could be worth more under better management. To find these companies, consider the following.

- *Performance indicators:* The worse managed a firm is, the greater the potential for increasing value. Look for firms with low operating margins relative to the sector, low returns on capital relative to cost of capital, and very low debt ratios.
- Potential for management change: You have to

change management for value to increase. Search for companies where the field is not tilted in management's favor (with voting right differences or anti-takeover amendments) and where management change, if not imminent, is at least possible.

- Early warning system: If everyone else in the market sees what you do (potential for value and management change), you will not gain much. Focus on firms where there is a catalyst for management change: an ageing CEO, a new investor on the board of directors, or a change in the corporate charter.
- If you are right in your assessment, you don't have to wait for the management change to happen. The payoff on your investment will occur when the rest of the market recognizes that change is likely and pushes up the stock price to reflect that change.

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Chapter Nine



Doomsday: Valuing Declining Companies

IN THE 1960S, GENERAL MOTORS (GM) was the engine that drove the US economy, but in 2009 it was a distressed company facing bankruptcy. Sears Roebuck (SHLD), a company that invented mail order retailing, has been shutting down stores over the last few years as its customers have moved to competitors. As companies age and see their markets shrink and investment opportunities dissipate, they enter the final phase of the life cycle, which is decline. While investors and analysts often avoid these firms, they may offer lucrative investment opportunities for long-term investors with strong stomachs.

Growth companies do not want to mature, and mature companies constantly try to rediscover their growth roots. By the same token, no mature company wants to go into decline, with the accompanying loss of earnings and value. So how would we differentiate between mature firms and firms in decline? Firms in decline generally have little in terms of growth potential and even their existing assets often deliver returns lower than their cost of capital; they are value destroying. The best-case scenario is for orderly decline and liquidation, and the worst case is that they go bankrupt, unable to cover debt obligations.

Declining companies tend to share common characteristics, and these shared features create problems for analysts trying to value these firms.

• *Stagnant or declining revenues:* Flat revenues or revenues that grow at less than the inflation rate are an indicator of

operating weakness. It is even more telling if these patterns in revenues apply not only to the company being analyzed but to the overall sector, thus eliminating the explanation that the weakness is due to poor management.

- Shrinking or negative margins: Declining firms often lose pricing power and see their margins shrink as they lose market share to more aggressive competitors.
- Asset divestitures: Since existing assets are sometimes worth more to other investors, who intend to put them to different and better uses, asset divestitures will be more frequent at declining firms, and especially so if these firms owe money.
- Big payouts—dividends and stock buybacks: Declining firms have little need for reinvestment and are thus often able to pay out large dividends, sometimes exceeding their earnings, and also buy back stock.
- Financial leverage—the downside: If debt is a double-edged sword, declining firms often are exposed to the wrong edge. With stagnant and declining earnings from existing assets and little potential for earnings growth, debt burdens can become overwhelming.

Valuing declining and distressed companies require us to balance their declining fortunes with the need to return cash to both their stockholders and lenders.

Valuation Issues

The historical data is depressing, with existing investments generating flat or even declining revenues accompanied by falling margins. In the aggregate, the company may be generating returns on capital that are less than its cost of capital. Rather than investing in new assets, the firm may be shedding assets and shrinking, altering both its asset mix and often its financing mix. As the business and financing mix of the firm changes, its risk characteristics will also change, altering its costs of equity and capital. Even if you overcome these challenges and estimate

expected cash flow for a declining firm, you must consider the possibility that the firm being valued will not make it to stable growth; many distressed firms will default and go out of business or be liquidated. Even if a firm is expected to survive, the expected growth rate in perpetuity may not only be well below the growth rate of the economy and inflation, but also in some cases it can even be negative. Essentially, the firm will continue to exist but get progressively smaller over time as its market shrinks.

Analysts who fall back on relative valuation as a solution to the problems of valuing declining or distressed firms, using intrinsic valuation, will find themselves confronting these estimation issues when they use multiples and comparable firms:

- *Scaling variable:* Earnings and book values can become inoperative very quickly, with both numbers becoming negative; repeated losses can drive the book value of equity down and into negative territory.
- Comparable firms: When the other firms in the business are healthy and growing, the challenge is working out a discount for the declining firm relative to the values being attached to healthy firms. In a sector where many or even all the firms are in decline, not only do your choices of what multiple to use become more limited, but you must consider how best to adjust for the degree of decline in a firm.
- *Incorporating distress:* Firms that have a higher likelihood of distress will trade at lower values (and hence at lower multiples) than firms that are more likely to make it. That does not make them cheap.

The symptoms of decline caused by too much debt and declining earnings will not disappear just because we base our value on a revenue multiple.

Valuation Solutions

Flat revenues, declining margins, and the potential for distress make valuing distressed companies tricky. In this section, we will look at how best to navigate the challenges in both the intrinsic and relative valuation framework.

Intrinsic Valuation

We will build our analysis of declining firms around two key questions. The first is whether the decline that we are observing in a firm's operations is reversible or permanent. In some cases, a firm may be in a tailspin but can pull out of it with a new management team in place. The second relates to whether the firm faces a significant possibility of distress; not all declining firms are distressed. We will incorporate both conclusions into an adapted version of the intrinsic valuation model. To illustrate the process, we will value Bed Bath & Beyond, a retail company that, like many other companies in the US retail space, found its fortunes upended by online retailing and changing customer tastes. The company, which became a mainstay of US retailing in the 1990s, had seen its annual revenues drop from \$12.3 billion in 2017 to \$7.4 billion in 2023, and its operating profits of \$1.55 billion in 2014 become operating losses of \$386 million in 2022. The company has tried to adapt by shutting down non-performing stores, but revenues even at many of its best-performing stores saw year-to-year declines.

In conventional discounted cash flow valuation, you value the business as a going concern and assume that there is only a small probability of bankruptcy or that capital markets are open, accessible, and liquid. If the likelihood of distress is high, access to capital is constrained (by internal or external factors), and distress sale proceeds are significantly lower than going-concern values, discounted cash flow valuations will overstate firm and equity value for distressed firms, even if the cash flows and the discount rates are correctly estimated. An augmentation to the standard discounted cash flow model is to separate the going-concern assumptions and the value that emerges from it from the effects of distress. To value the effects of distress, first value the firm as a going concern, and then estimate the cumulative probability that the firm will become distressed over the forecast period and the proceeds you expect to get from the sale.

The first step is to value a firm on the assumption that it will stay a

going concern. Thus, you estimate expected revenues, operating margins, and taxes for the firm, on the assumption that the firm will recover to health, operating under the constraint that it will be limited in its capacity to reinvest. In making these estimates, you must be realistic in considering what health will look like for the declining firm: it may very well require the firm to shrink and settle for little or no growth in the long term. When estimating discount rates, you must assume that debt ratios will, in fact, decrease over time if the firm is over-levered, and that the firm will derive tax benefits from debt as it turns the corner toward profitability. This is consistent with the assumption that the firm will remain a going concern. To value Bed Bath & Beyond (BBBYQ) as a going concern, we assumed that revenues would continue to decline for the next five years, with a 10% drop in the first year followed by 5% declines in the next four years, before the company finds a retail model that works, allowing it to grow at 3% a year. We also assumed that this new business model would be able to generate an operating margin of 5.54%, the US retail industry average, but only after year 5. In this transition, we expect that BBBYQ will close stores, recovering some of the capital tied up in these store leases and settings, and as the company reverts back to health, its cost of capital will drop from 8.79 percent to 7.50 percent, towards the 75th percentile of costs of capital for US retailers. The effect of these changes is reflected in Table 9.1.

To complete the valuation, we will assume that Bed Bath & Beyond will be in stable growth after year 10, growing at 3 percent a year (set equal to the risk-free rate cap) forever. We will also assume that the return on capital will be 7.5 percent in perpetuity, set equal to the stable period cost of capital of 7.5 percent.

Reinvestment rate =
$$\frac{\text{Stable growth rate}}{\text{Stable return on capital}} = \frac{3.0\%}{7.5\%} = 40.00\%$$

Table 9.1 Value of Operating Assets for Bed Bath & Beyond

	Revenu@peratibig[7]	г ввіт	Reinvestmen	Cost of
	margin	×		capital
		(1-t)		
1	\$7,081-1.00%	\$71	\$0 -\$7	1 8.79%
	\$70.	81		

2	\$6,727	1.62%\$	108.72	\$109	-\$177	\$286	8.79%
3	\$6,391	2.92%\$	186.89	\$187	-\$168	\$355	8.79%
4	\$6,071	4.23%\$	256.96	\$257	-\$160	\$417	8.79%
5	\$5,768	5.54%\$	319.56	\$244	-\$152	\$396	8.79%
6	\$5,572	5.54%\$	308.69	\$232	-\$98	\$330	8.53%
7	\$5,471	5.54%\$	303.14	\$227	-\$50	\$277	8.27%
8	\$5,460	5.54%\$	302.53	\$227	-\$5	\$232	8.01%
9	\$5,537	5.54%\$	306.77	\$230	\$38	\$192	7.76%
10	\$5,703	5.54%\$	315.97	\$237	\$83	\$154	7.50%
Termin	a\$5,874	5.54%\$	325.45	\$244	\$73	\$171	7.50%
year							

Terminal value

$$= \frac{A f ter\text{-tax operating income}_{Terminal \ year} \left(1 - Reinvestment \ rate\right)}{\left(Cost \ of \ capital_{stable} - g_{stable}\right)}$$

$$= \frac{$244(1-0.40)}{0.075-0.03} = $3,253$$
 million.

This value is based on the presumption that while Bed Bath & Beyond is in trouble, with their existing business model, the business (retailing) itself will be re-created to be a viable and growing part of the economy. There are some businesses, such as tobacco and fossil fuels, where you may believe that the entire business is in long-term decline, and in these businesses, you should consider making the stable growth rate a negative number, effectively shrinking the company over time, to nothing.

Discounting the cash flows in Table 8.1 at the cumulative cost of capital and adding the present value of the terminal value generates a value of \$3,097 million for the operating assets. Adding cash (\$440 million), subtracting out the market value of debt (\$3,085 million), and dividing by the number of shares outstanding (92.5 million) yields a value for the equity of \$4.89 per share.

Value/share =
$$\frac{\text{Operating assets} + \text{Cash} - \text{Debt}}{\text{Number of shares}}$$
$$= \frac{3097 + 440 - 3085}{92.50}$$
$$= $4.89/\text{share}.$$

The second step is to estimate the cumulative probability of distress over the valuation period. A simple approach to doing this is to use the bond rating for a firm and the history of default rates of firms in that rating class to estimate the probability of distress. Moody's estimated the cumulative probabilities of default for bonds in different ratings classes over 5- and 10-year periods following issuance; these estimates are listed in Table 9.2.

VALUE DRIVER #1: GOING-CONCERN VALUE

Some declining and distressed firms make it back to health. If your firm is one of those, what will it be worth as a going concern?

Table 9.2 Bond Rating and Probability of Default: 1920–2022

Moody's Rating	Within 5 years	Within 10 years
Aaa	0.10%	0.70%
Aa	0.60%	1.80%
A	1.00%	2.70%
Baa	2.30%	5.20%
Ba	8.30%	16.40%
В	19.30%	31.90%
Caa-C	31.50%	46.00%

As elaboration, Bed Bath & Beyond had a rating of B in 2022, and the cumulative default probability for a B rated bond is 31.90

percent over the next 10 years. This approach works for distressed and declining companies that are rated by the major ratings agencies, but in the absence of a rating, you will need to be more creative.

VALUE DRIVER #2: LIKELIHOOD OF DISTRESS

Most declining and distressed firms don't make it back to health. What is the likelihood that your firm will fail?

As a third step, we must consider the logical follow-up question to estimating the probability of distress. What happens then? It is not distress per se that is the problem but the fact that firms in distress must sell their assets for less than the present value of the expected future cash flows from existing assets and expected future investments. Often, they may be unable to claim even the present value of the cash flows generated by existing investments. Consequently, a key input that we need to estimate is the expected proceeds in the event of a distress sale. One practical way of estimating distress sale proceeds is to consider them as a percent of book value of assets, based on the experience of other distressed firms. For businesses whose value comes more from intangible assets than from physical assets that can be liquidated, distress proceeds can be stated as a percent of fair value.

For Bed Bath & Beyond, we will assume that in the event of distress, it will receive only a quarter of its fair value, which results in a distress sale value of \$774 million (a quarter of its fair value of \$3,097 million). Adding the current cash balance of \$440 million generates proceeds far less than the face value of \$3,085 million for the debt; thus, the equity investors would receive nothing in the event of a distress sale. While the value per share as a going concern (from a discounted cash flow valuation) is \$4.89, adjusting for the likelihood of default of 31.90 percent (based on its B bond rating) yields an adjusted value of \$3.33.

Distress adjusted value per share =
$$$4.89 (1-0.319)$$

+ $$0.00 (0.319)$
= $$3.33$

This was significantly lower than the stock price of \$8.79 at the time of the valuation.

There is one final consideration that may affect equity value. In healthy companies, you buy equity for expected cash flows: dividends, stock buybacks, or even cash accumulation in the firm. In distressed companies, you invest in the stock for a different reason: the hope that the company will turn its business around and be able to return to health. In effect, the fact that the stock price cannot fall below zero and that equity investors get whatever is left over after lenders have been paid gives equity in distressed companies the characteristics of a call option. In firms with substantial debt and a significant potential for bankruptcy, the option value of equity may be more than the discounted cash flow value of equity. The implication of viewing equity as a call option is that equity will have value, even if the value of the firm falls well below the face value of the outstanding debt. This will especially be the case when the firm is in a risky business (risk increases the likelihood that the value of the assets will rise in the future) and has long-term debt (the option has more time to pay off).

VALUE DRIVER #3: CONSEQUENCES OF DISTRESS

In the event of failure, the assets of the firm will be sold and the distress proceeds used to pay down debt. Assuming distress occurs at your firm, what are the consequences?

Relative Valuation (Pricing)

There are two ways in which relative valuation can be adapted to distressed or declining companies. In the first, you compare a distressed company's valuation to the valuations of other distressed companies. In the second, you use healthy companies as comparable companies but find a way to adjust for the distress that the firm you are valuing is facing.

To value a distressed firm, you can find a group of distressed firms in the same business and look at how much the market is willing to pay for them. For instance, you could value a troubled telecom firm by looking at the enterprise value to sales (or book capital) multiples at which other troubled telecommunication firms trade. While there is promise in this approach, it works only if many firms in a sector slip into financial trouble at the same time. In addition, by categorizing firms as distressed or not distressed, you run the risk of lumping together firms that are distressed to different degrees. Comparing Bed Bath & Beyond to other retail firms in 2022, the only multiples that can be computed, given its losses, are revenue multiples (EV to sales or price to sales). On that basis, trading at just about half its revenues (an EV-to-sales ratio of 0.5), the company looks cheap relative to the retail sector, where the average EV-to-sales ratio was 0.81 in 2022, but that does not take into account the declining revenues and impending distress at the company.

Akin to the approach used with discounted cash flow valuation, you can value the distressed firm by highlighting healthy firms in the business as comparable firms and looking at how they are priced. To value the distressed company, you assume that the firm reverts back to health, and you forecast revenues or operating income in a future year. You estimate an expected value in the future time period and discount this value back to the present to get a going-concern value for the firm. You then bring in the probability of distress and the distress sale proceeds to value the firm today, with both inputs being estimated as they were in the last section. To value Bed Bath & Beyond using this approach, we first estimate revenues of \$5,703 million in year 10 if the firm makes it back to health. Applying the retail industry-average EV/ sales multiple of 0.81 in 2022, we obtain a value of \$4,619 million 10 years from now:

Expected enterprise value in 10 years =
$$$5,703 \times 0.81$$

= $$4,619$ million.

Discounting back to today (at the costs of capital from Table 8.1) yields a value of \$2,062 million. In the event of distress, the sale proceeds from asset sales are expected to be only \$1,214 million. Adjusting for the probability and effect of distress results in an enterprise value of \$6,277 million today.

Value today =
$$$2,062(1-0.319) + $1,214(0.319)$$

= $$1,877$ million.

Adding cash and subtracting out debt yields a negative value for equity, suggesting that on a pricing basis, if you control for distress and time value, equity in Bed Bath & Beyond should be worth nothing in 2022.

Value Plays

Investors with long time horizons and strong stomachs can use two strategies with declining companies. The first is to invest in declining companies, where the decline is inevitable and management recognizes that fact. While there will be little price appreciation from your equity investments, you will get large cash flows, as assets are divested, and the cash used for dividends and stock buybacks. In effect, your stock will behave like a high-yield bond.

The second is to make a turnaround play, where you invest in declining or distressed companies with the hope that they revert to health and, in the process, deliver substantial upside. To pull off this strategy, you should consider the following.

a. *Operating potential:* A firm with solid operating assets can become distressed because of its overuse of debt. Search for overleveraged firms with valuable

assets in otherwise healthy businesses.

- b. *Debt restructuring:* For overleveraged firms to recover, there has to be a reduction in the debt burden, coming either from improving operating performance or renegotiation of the debt terms. Look for firms where debt restructuring is being actively pursued and where the likelihood of success is high.
- c. Access to new capital: Survival becomes much easier if a distressed firm can raise new capital. Focus on firms that have more access to equity or bank financing to improve your odds of success.

If you do invest in distressed companies, your hope is that those companies that manage to turn themselves around will offer high enough returns to cover your losses on the many companies that will fail.

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Breaking the Mold —Special Situations in Valuation

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Chapter Ten



Bank on It: Valuing Financial Service Companies

THROUGH THE DECADES, BANKS and insurance companies have been touted as good investments for risk-averse investors who value dividends. Invest in Citigroup (CITI) and American Insurance Group (AIG), they were told, and your investment will be safe. Not only did these firms pay large and stable dividends, but they were considered safe because they were regulated. The banking crisis of 2008 revealed that even regulated firms can be guilty of reckless risk taking. While some of these firms may be good investments, buyers must do their homework, assessing the sustainability of dividends and the underlying risk.

Financial service businesses fall into four groups, depending on how they make their money. A *bank* makes money on the spread between the interest it pays to those from whom it raises funds and the interest it charges those who borrow from it and from other services it offers to depositors and its lenders. *Insurance companies* make their income in two ways. One is through the premiums they receive from those who buy insurance protection from them and the other is income from the investment portfolios that they maintain to service the claims. An *investment bank* provides advice and supporting products for other firms to raise capital from financial markets or to consummate transactions (acquisitions, divestitures). *Investment firms* provide investment advice or manage portfolios for clients. Their income comes from advisory fees for the advice and management and sales fees for investment portfolios. With the consolidation in the financial

services sector, an increasing number of firms operate in more than one of these businesses.

Financial service firms are regulated all over the world, and these regulations take three forms. First, banks and insurance companies are required to meet regulatory capital ratios, computed based on the book value of equity, to ensure that they do not expand beyond their means and put their claimholders or depositors at risk. Second, financial service firms are often constrained in terms of where they can invest their funds. For instance, until a decade ago, the Glass-Steagall Act in the United States restricted commercial banks from investment banking activities as well as from taking active equity positions in nonfinancial service firms. Third, the entry of new firms into the business is often controlled by the regulatory authorities, as are mergers between existing firms.

The accounting rules used to measure earnings and record book value are also different for financial service firms than those for the rest of the market. The assets of financial service firms tend to be financial instruments such as bonds and securitized obligations. Since the market price is observable for many of these investments, accounting rules have tilted toward using market value for these assets—*marked to market*, so to speak.

Valuation Issues

There are two primary challenges in valuing banks, investment banks, or insurance companies. The first is that drawing a distinction between debt and equity is difficult for financial service firms. When we talk about capital for nonfinancial service firms, we tend to talk about both debt and equity. With a financial service firm, debt has a different connotation. Debt to a bank its raw material, something to be molded into other products that can then be sold at a higher price and yield a profit. In fact, the definition of what comprises debt also is murkier with a financial service firm than it is with a nonfinancial service firm, since deposits made by customers into their checking accounts at a bank technically meet

the criteria for debt. Consequently, capital at financial service firms must be narrowly defined as including only equity capital, a definition reinforced by the regulatory authorities, who evaluate the equity capital ratios of banks and insurance firms.

Defining cash flow for a bank is also difficult, even if it is defined as cash flows to equity. Measuring net capital expenditures and working capital can be problematic. Unlike manufacturing firms, which invest in plant, equipment, and other fixed assets, financial service firms invest primarily in intangible assets such as brand name and human capital. Consequently, their investments for future growth often are treated as operating expenses in accounting statements. If we define working capital as the difference between current assets and current liabilities, a large proportion of a bank's balance sheet would fall into one or the other of these categories. Changes in this number can be both large and volatile and may have no relationship to reinvestment for future growth.

The same issues raise their head in relative valuation. Multiples based on enterprise value are very difficult, if not impossible, to compute for financial service firms. Controlling for differences in growth and risk is also more difficult, largely because accounting statements are opaque.

Valuation Solutions

If you cannot clearly delineate how much a financial service firm owes and what its cash flows are, how can you ever get an estimate of value? We deploy the same techniques in both intrinsic and relative valuation to overcome these problems: we value equity (rather than the firm) and use dividends, the only observable cash flow.

Intrinsic Valuation

If you accept the propositions that capital at a bank should be narrowly defined to include only equity and that cash flows to equity are difficult (if not impossible) to compute because net capital expenditures and working capital cannot be defined, you are left with only one option: the *dividend discount model*. While we will spend the bulk of this section talking about using dividends, we will present two other alternatives. One is to adapt the free cash flow to equity measure to define reinvestment as the increased regulatory capital required to sustain growth. The other is to keep the focus on what financial service firms generate as a return on equity, relative to the cost of equity, and to value these excess returns.

Dividend Discount Models In the basic dividend discount model, the value of a stock is the present value of the expected dividends on that stock. For a stable growth dividend-paying firm, the value of a stock can be written as follows:

Value of equity =
$$\frac{\text{Expected dividends next year}}{\text{Cost of equity} - \text{Expected growth rate}}$$

In the more general case, where dividends are growing at a rate that is not expected to be sustainable or constant forever during a period, we can still value the stock in two pieces: the present value (PV) of dividends during the high growth phase and the present value of the price at the end of the period, assuming perpetual growth. The dividend discount model is intuitive and has deep roots in equity valuation, and there are three sets of inputs in the dividend discount model that determine the value of equity. The first is the cost of equity that we use to discount cash flows, with the possibility that the cost may vary across time, at least for some firms. The second is the proportion of earnings that we assume will be paid out in dividends; this is the dividend payout ratio, and higher payout ratios will translate into more dividends for any given level of earnings. The third is the expected growth rate in dividends over time, which will be a function of the earnings growth rate and the accompanying payout ratio. In addition to estimating each set of inputs well, we also need to ensure that the inputs are consistent with each other.

The cost of equity for a financial service firm has to reflect the portion of the risk in the equity that cannot be diversified away by the marginal investor in the stock. There are three estimation notes

that we need to keep in mind when making estimates of the cost of equity for a financial service firm.

- *Use sector betas:* The large numbers of publicly traded firms in this domain should make estimating sector betas much easier.
- Adjust for regulatory and business risk: To reflect regulatory differences, define the sector narrowly; thus, look at the average beta across banks with similar business models. Financial service firms that expand into riskier businesses—securitization, trading, and investment banking—should have different (and higher) betas for these segments, and the beta for the company should reflect this higher risk.
- Consider the relationship between risk and growth:

 Expect high-growth banks to have higher betas (and costs of equity) than mature banks. In valuing such banks, start with higher costs of equity, but as you reduce growth, also reduce betas and costs of equity.

Consider a valuation of Citigroup, one of the largest commercial banks in the United States, in May 2023. We used a cost of equity of 11.67% in the valuation, with that number reflecting an implied cost of equity for large banks collectively, based on their pricing (price-to-book ratios) and returns on equity:

- Median price to book for big banks in May 2023 = 1.04.
- Median return on equity for big banks in May 2023 = 12.00%.
- Expected growth rate in perpetuity = 3.3% (set equal to risk-free rate).

As we noted in Chapter 3, in the relative valuation (pricing section):

PBV =
$$(ROE - g) / (Cost of equity - g)$$
,
 $1.04 = (0.12 - 0.033) / (Cost of equity - 0.033)$, so
Cost of equity = 0.1167, or 11.67%.

There is one final point that bears emphasizing here. The cost of

equity across large banks reflects the assumption that Citigroup, at least in 2023, was about as risky as the average large bank in the United States. If you are valuing a bank that is riskier or safer than the average bank, one way to incorporate this is to look at distribution of the implied costs of equity across banks and use a cost of equity at the 75th percentile for the riskier banks and at the 25th percentile for safer banks.

VALUE DRIVER #1: EQUITY RISK

While financial service firms may all be regulated, they are not equally risky. How does your firm's risk profile compare to that of the average firm in the sector?

There is an inherent trade-off between dividends and growth. When a company pays a larger segment of its earnings as dividends, it is reinvesting less and should thus grow more slowly. With financial service firms, this link is reinforced by the fact that the activities of these firms are subject to regulatory capital constraints; banks and insurance companies have to maintain equity (in book value terms) at specified percentages of their activities. When a company is paying out more in dividends, it is retaining less in earnings; the book value of equity increases by the retained earnings. In recent years, in keeping with a trend that is visible in other sectors as well, financial service firms have increased stock buybacks as a way of returning cash to stockholders. In this context, focusing purely on dividends paid can provide a misleading picture of the cash returned to stockholders. An obvious solution is to add the stock buybacks each year to the dividends paid and to compute the composite payout ratio. If we do so, however, we should look at the number over several years, since stock buybacks vary widely across time —a buyback of billions in one year may be followed by three years of relatively meager buybacks, for instance.

To ensure that assumptions about dividends, earnings, and growth

are internally consistent, we must bring in a measure of how well the retained equity is reinvested; the return on equity is the variable that ties together payout ratios and expected growth.

Expected growth in earnings = Return on equity \times (1 – Dividend payout ratio).

The linkage between return on equity, growth, and dividends is therefore critical in determining value in a financial service firm. At the risk of hyperbole, the key number in valuing a bank is not dividends, earnings, or expected growth but what we believe it will earn as *return on equity in the long term*. That number, in conjunction with payout ratios, will help in determining growth. Returning to the May 2023 valuation of Citigroup, the bank had reported a return on equity of 8.78 percent in the trailing 12 months. Citi paid 29.14 percent of its earnings as dividends in the trailing 12 months. Assuming that payout ratio remains unchanged, the estimated growth rate in earnings for Citigroup for the next five years is 6.22 percent:

Expected growth rate =
$$8.78\% (1-0.2914) = 6.22\%$$
.

Table 10.1 reports Citi's forecasted earnings and dividends per share for the next five years, assuming that its cost and return of equity stay locked in at current levels in perpetuity.

Table 10.1 Expected Earnings and Dividends for Citigroup in May 2023

	Base	1	2	3	4	5
,	vear					
Earnings		6.22%	6.22%	6.22%	6.22%	6.22%
growth -						
rate						
Return 8	3.78%	8.78%	8.78%	8.78%	8.78%	8.78%
on						
equity						
Net S	14,845	\$15,769	\$16,750	\$17,792	\$18,898	\$20,074
income _						

(\$ millions)						
Payout 2	29.14%	29.11%	29.11%	29.11%	29.11%	29.11%
ratio Dividend	\$4,326	\$4,591	\$4,877	\$5,180	\$5,502	\$5,845
(\$ millions)						

This linkage between growth, payout, and ROE is also useful when we get to stable growth, since the payout ratio that we use in stable growth to estimate the terminal value should be:

Payout ratio in stable growth =
$$1 - \frac{\text{Expected growth rate}}{\text{Stable period ROE}}$$
.

The risk of the firm should also adjust to reflect the stable growth assumption, and if betas are used to estimate the cost of equity, they should converge toward one in stable growth. With Citi, we assume that the expected growth rate in perpetuity after year 5 is 3 percent, that the cost of equity stays at 11.67%, and that its return on equity remains at 8.78%.

Payout ratio in stable growth =
$$1 - \frac{3.00\%}{8.78\%} = 65.82\%$$
.

Terminal value =
$$\frac{\text{Net Income in year } 6 \times \text{Stable payout}}{\text{Cost of equity} - \text{Expected growth rate}}$$
$$= \frac{20074(1.03)(0.6582)}{0.1167 - 0.03} = \$156,964.$$

Discounting the expected dividends for the next five years (from Table 9.1), and the terminal value back at the current cost of equity of 11.67 percent, yields a value per share of \$55.68, higher than the prevailing price of \$46.32 at the time. Note that the story in this valuation is a downbeat one, since Citigroup continues to earn a return on equity well below its cost of equity in perpetuity, trapped in a bad business, with no escape hatches. Notwithstanding that pessimism, the stock still looks undervalued.

VALUE DRIVER #2: QUALITY OF GROWTH

Growth can add, destroy, or do nothing for value. What return on equity do your see your firm generating, as it pursues growth?

Cash Flow to Equity Models Earlier in the chapter, we looked at the difficulty in estimating cash flows when net capital expenditures and noncash working capital cannot be easily identified. It is possible, however, to estimate cash flows to equity for financial service firms if you define reinvestment differently. With financial service firms, the reinvestment generally is in regulatory capital; this is the capital as defined by the regulatory authorities, which, in turn, determines the limits on future growth. To estimate the reinvestment in regulatory capital, we need to specify a target book equity capital ratio that the bank aspires to reach; this will be heavily influenced by regulatory requirements but will also reflect choices made by the bank's management. Conservative banks may choose to maintain a higher capital ratio than required by regulatory authorities, whereas aggressive banks may push toward the regulatory constraints.

To illustrate, assume that you are valuing a bank that has \$100 million in loans outstanding and a book value of equity of \$6 million. Assume that this bank expects to make \$5 million in net income next year and would like to grow its loan base by 10% over the year, while also increasing its regulatory capital ratio to 7%. We can compute the cash flow to equity thus:

Net income = \$5.00 million. Reinvestment = \$1.70 million

(7% of \$110 million – \$6 million).

Cash flow to equity = \$3.30 million.

This cash flow to equity can be considered a potential dividend and replace dividends in the dividend discount model. Generalizing from this example, banks that have regulatory capital shortfalls should be worth less than banks that have built up safety buffers since they will need to reinvest more to get capital ratios back to target levels. Applying this approach to Citigroup in April 2023, the bank had a tier 1 capital ratio of 14.80%, putting them toward the top quartile of big banks. However, the failure of Silicon Valley Bank just a few weeks before this valuation may make both the banks and regulators more conservative, and we assume that the tier 1 capital ratio will be raised to 15% over time. Allowing for improvements in return on equity over time, we estimated a free cash flow to equity valuation of Citigroup of \$68.58 per share, as shown in Table 10.2.

The terminal value is estimated, assuming a growth rate of 3% in perpetuity, with a return on equity of 9.50%:

Terminal value of equity

$$= \frac{\text{(Net income in year 6)} \times \left(1 - \frac{\text{Growth rate}}{\text{ROE}}\right)}{\text{Cost of equity - Growth rate}}$$
$$= \frac{19,522(1.03) \times \left(1 - \frac{0.03}{0.095}\right)}{0.1167 - 0.03}$$
$$= \$158,972 \text{ million.}$$

Table 10.2 Expected Free Cashflow to Equity (in \$ millions) for Citigroup in May 2023

Cui ent	Terminal
	year
Risk- \$1,142, \$8 5177, \$7 5212, \$9 3248, \$7 1286, \$ 40325	, 63, 3364,784
adjusted	
assets	
Tier 1 14.80%14.84%14.88%14.92%14.96%15.00%	15.00%
Capital	
ratio	

Tier 1	'	4\$ 174,6	9\$1180,4	2\$ 186,3	39192,4	4\$ 198,7	5\$204,718
Capital							
Change	•	\$5,549	\$5,729	\$5,916	\$6,109	\$6,307	\$5,963
in							
regulat	ory						
capital							
(Tier 1				1 1			
Book	\$182,1	9\$1187,7	4\$ 193,4	7\$2199,3	8\$205,4	9 \$7 211,8	0\$1218,158
equity							
ROE					9.36%		
Net	\$14,84	5\$16,25	4 \$17,02	1\$17,82	0\$18,65	3\$19,52	2\$20,121
income							
_	H	\$5,549	\$5,729	\$5,916	\$6,109	\$6,307	\$6,354
Investr	nent						
in							
regulat	ory						
capital							
=	H	\$10,70	5 \$11,29	1\$11,90	4 \$12,54	5\$13,21	5\$13,767
FCFE							
Termir	al					\$158,7	92
value							
of							
equity							
Present		\$9,586	\$9,055	\$8,548	\$8,067	\$99,05	2
value							
Cost of	11.67%	511. <mark>67</mark> 9	511.679	511.679	511.67%	11.679	611.67%
equity							
Value	\$134,3	08					
of							
equity							
today =	=						
Numbe	ri 958.3	0			<u> </u>		
of							
shares							
outstan	ding						
=							
	H	4					

Value \$68.58			
per share =			
share =			

VALUE DRIVER #3: REGULATORY BUFFERS

Shortfalls (safety buffers) in regulatory capital can affect future dividends. How does your firm's capital ratio measure up against regulatory requirements?

The value of equity per share is \$68.58, higher than in the dividend discount model, with part of the increase coming from the improvement in return on equity over time from 8.78% to 9.50% and part of it coming from a reassessment of what Citigroup is doing with its retained earnings.

Excess Return Models The third approach to valuing financial service firms is to use an excess return model, where excess returns are defined as the difference between ROE and the cost of equity. In such a model, the value of equity in a firm can be written as the sum of the equity invested in a firm's current investments and the value added by expected excess returns to equity investors from these and future investments.

Value of equity = Equity capital invested currently
+ Present value of expected excess
returns to equity investors.

The most interesting aspect of this model is its focus on excess returns. A firm that invests its equity and earns just the fair market rate of return on these investments should see the market value of its equity converge on the equity capital currently invested in it. A firm that earns a below-market return on its equity investments will see its equity market value dip below the equity capital

currently invested. The two key inputs into the excess return model are the return on equity and the cost of equity.

Excess equity return = (Return on equity – Cost of equity) (Equity capital invested).

Framing the value of financial service firms in terms of excess returns also provides insight into the risk/return trade-off that they face. Faced with low returns on equity in traditional banking, many banks have expanded into trading, investment banking, real estate, and private equity. The benefits of moving into new businesses that offer higher returns on equity can be partly or completely offset by the higher risk in these businesses. To analyze a bank, you need to look at both sides of the ledger: the return on equity the bank generates on its activities and the risk it is exposed to as a consequence. The excess returns approach also offers insight into the effects of regulatory changes on value. Increases in regulatory capital requirements will reduce return on equity and by extension, excess returns and values at banks.

We can frame the Citigroup valuation in excess returns terms, albeit with a negative twist. The book value of equity at Citi at the end of 2022 was \$182.19 billion. Since we are assuming in both the dividend and FCFE valuations that Citi will continue to earn returns on equity well below its cost of equity in perpetuity, the present value of these negative excess returns, continuing forever, reduces book value. Not surprisingly, our estimated valuations for the bank come in well below book value, at \$109.04 billion in the dividend valuation and at \$134.3 billion in the FCFE valuation.

Relative Valuation (Pricing)

In keeping with our emphasis on equity valuation for financial service firms, the multiples that we will work with to analyze financial service firms are equity multiples—PE ratios and price-to-book ratios.

The price/earnings ratio for a bank or insurance company is measured the same as it is for any other firm, by dividing the current price by earnings per share. As with other firms, the price/ earnings ratio should be higher for financial service firms with higher expected growth rates in earnings, higher payout ratios, and lower costs of equity. An issue that is specific to financial service firms is the use of provisions for expected expenses. For instance, banks routinely set aside provisions for bad loans. These provisions reduce the reported income and affect the reported price/earnings ratio. Consequently, banks that are more conservative about categorizing bad loans will report lower earnings, whereas banks that are less conservative will report higher earnings. Another consideration in the use of earnings multiples is the diversification of financial service firms into multiple businesses. The multiple that an investor is willing to pay for a dollar in earnings from commercial lending should be very different from the multiple that the same investor is willing to pay for a dollar in earnings from trading. When a firm is in multiple businesses with different risk, growth, and return characteristics, it is very difficult to find truly comparable firms and to compare the multiples of earnings paid across firms.

The price-to-book-value ratio for a financial service firm is the ratio of the price per share to the book value of equity per share. Other things remaining equal, higher growth rates in earnings, higher payout ratios, lower costs of equity, and higher returns on equity should all result in higher price-to-book ratios, with return on equity being the dominant variable. If anything, the strength of the relationship between price-to-book ratios and returns on equity should be stronger for financial service firms than for other firms because the book value of equity is much more likely to track the market value of existing assets. While emphasizing the relationship between price-to-book ratios and returns on equity, don't ignore the other fundamentals. For instance, banks vary in terms of risk, and we would expect for any given return on equity that riskier banks should have lower price-to-book-value ratios. Similarly, banks with much greater potential for growth should have much higher price-to-book ratios for any given level of the other fundamentals.

Table 10.3 Pricing Citigroup in April 2023

Citigroup	JP Morgan	25 largest
-		banks (median)

Growth rate in deposits 3.74%	9.69%	10.66%
Tier 1 Capital 14.80%	14.85%	11.12%
Return on 8.78% equity	14.53%	10.66%
Price-to-book 0.50	1.53	1.04

Assume that you were trying to price Citigroup in May 2023. Trading at half of book value, it is the cheapest bank of the 25 biggest banks in the United States. Before you conclude that it is a good buy, it is worth noting that it has also had one of the lowest growth rates in deposits over the prior five years, as well as a subpar return on equity, as you can see in Table 10.3, where we compare Citigroup's pricing to that of JP Morgan and to the top 25 banks collectively.

As you can see, JP Morgan dominates Citigroup on every fundamental, with higher growth in deposits, a slightly higher tier 1 capital ratio, and a much higher return on equity, but it trades at a price-to-book ratio three times that of Citigroup. In sum, JP Morgan is clearly the better bank, but Citigroup may be the better investment.

Value Plays

Investing in financial service companies has historically been viewed as a conservative strategy for investors who wanted high dividends and preferred price stability. Investing in these firms today requires a more nuanced strategy that goes beyond looking at the dividend yield and current earnings and looks at potential risk in these firms by examining the following.

• Capitalization buffer: Most financial service firms are governed by regulatory requirements on capital. Look for firms that not only meet but also beat

regulatory capital requirements.

- Operating risk: Risk can vary widely across financial service firms within a sector (banks, insurance companies). Seek out firms that are operating in average risk or below average risk businesses, while generating healthy earnings.
- *Transparency:* Transparency in reporting allows investors to make better assessments of value, and the failure to be transparent may be a deliberate attempt to hide risk. Search for firms that provide details about their operations and the risks that they may be exposed to.
- Significant restrictions on new entrants into the business: High returns on equity are a key factor determining value. Check for firms that operate in profitable businesses with significant barriers to new entrants.

In summary, invest in financial service firms that not only deliver high dividends but also generate significant returns on equity from relatively safe investments. Avoid financial service firms that overreach—investing in riskier, higher growth businesses—without setting aside sufficient regulatory capital buffers.

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Chapter Eleven



Roller Coaster Investing: Valuing Cyclical and Commodity Companies

WHAT WAS TOYOTA MOTORS WORTH in 2007, when the global economy was booming and the firm was profitable? What about two years later, at a height of recession? If oil prices are expected to surge, how much will Exxon Mobil's stock price go up? Uncertainty and volatility are endemic to valuation, but cyclical and commodity companies have volatility thrust on them by external factors such as ups and downs of the economy and movements in commodity prices. Even mature cyclical and commodity companies have volatile earnings and cash flows, making investing in them akin to riding a roller coaster.

There are two groups of companies that we look at in this chapter. The first group, drawn from sectors such as housing and automobiles, includes cyclical companies, with earnings that track overall economic growth. The second group includes commodity companies that derive their earnings from producing commodities that may become inputs to other companies in the economy (oil, iron ore) or be desired as collectibles (gold, platinum, diamonds).

Both types of companies share some common characteristics that can affect how they are valued.

• The economic/commodity price cycle: Cyclical companies are at the mercy of the economic cycle. The odds are high that most cyclical companies will see revenues decrease in the face of a significant economic downturn and rise when the economy recovers. Commodity companies are, for the most

part, price takers. When commodity prices are on the upswing, all companies that produce that commodity benefit, whereas during a downturn, even the best companies in the business will see earnings decline.

• *Finite resources:* With commodity companies, there is another shared characteristic. There is a finite quantity of natural resources on the planet; if oil prices increase, we can explore for more oil, but we cannot create oil. When valuing commodity companies, this will not only play a role in what our forecasts of future commodity prices will be but may also operate as a constraint on our normal practice of assuming perpetual growth (in our terminal value computations).

When valuing commodity and cyclical companies, we must grapple with the consequences of economic and commodity price cycles and how shifts in these cycles will affect revenues and earnings. We also must come up with ways of dealing with the possibility of distress, induced not by bad management decisions or firm-specific choices but by macroeconomic forces.

Valuation Issues

In valuing commodity and cyclical companies, the inputs are heavily affected by macro variables—the price of the commodity in the case of commodity companies and the state of the economy for cyclical firms. As commodity prices and economic growth rates change, operating income will change by more, because of the high fixed costs at these firms. Thus, commodity companies may have to keep mines (mining), reserves (oil), and fields (agricultural) operating even during low points in price cycles, because the costs of shutting down and reopening operations can be prohibitive. This volatility in earnings will feed into both equity and debt values (thus affecting cost of capital) and potentially put even the healthiest firms at risk of distress and default if the macro move is very negative.

The same factors will also play out in relative valuations.

Multiples of earnings such as PE or EBITDA multiples will swing widely for cyclical and commodity companies. While growth potential can vary across companies, growth rates can also change dramatically across the cycle.

Valuation Solutions

The easiest way to value cyclical and commodity companies is to look past the year-to-year swings in earnings and cash flows and to look for a smoothed-out number underneath. There are usually three standard techniques that are employed for normalizing earnings and cash flows of cyclical companies.

- 1. Simple average over time: The most common approach used to normalize earnings is to average them over time. The averaging should occur over a period long enough to cover an entire cycle; the typical economic cycle in the United States lasts 5 to 10 years. This is a simple approach, but using an absolute value will yield too low a number for a growing company.
- 2. Scaled average over time: A simple solution to the scaling problem is to compute averages for a scaled version of the variable over time, with the scaling against revenues or invested capital. In effect, you can average profit margins over time instead of actual profits and apply the average profit margin to revenues in the most recent period to estimate normalized earnings.
- 3. Sector averages: For firms with limited or unreliable history, it may make more sense to look at sector averages in order to normalize. Thus, you can compute operating margins for all steel companies across the cycle and use the average margin to estimate operating income for an individual steel company. Sector margins tend to be less volatile than individual company margins, but this approach will also fail to incorporate the characteristics that may lead a firm to be different from the rest of the sector.

To see normalization in action, consider a valuation of Toyota (TYT) in early 2009, when it was still considered the best-run automobile company in the world, and before Tesla upended thinking on the auto business. However, the firm was not immune to the ebbs and flows of the global economy and reported a loss in the last quarter of 2008, a precursor to much lower and perhaps negative earnings in its April 2008 to March 2009 fiscal year. Applying the average pretax operating margin of 7.33 percent earned by Toyota from 1998 to 2009 to its trailing 12-month revenues of 22,661 billion yen yields an estimate of normalized earnings.

Normalized operating income =
$$22,661 \times 0.0733$$

= $1,660.7$ billion yen.

Assuming that Toyota is a mature company with a stable growth rate of 1.5 percent and a return on capital of 5.09 percent, set equal to its cost of capital in stable growth, allows us to estimate the value of operating assets today as 19,640 billion yen.

$$\frac{\text{Opeating income} \left(1+g\right) \left(1-tax \ rate\right) \left(1-\frac{Growth \ rate}{Return \ on \ capital}\right)}{\left(Cost \ of \ capital-Growth \ rate\right)}$$

$$= \frac{1660.7(1.015)(1-.40)\left(1-\frac{.015}{.0509}\right)}{(.0509-.015)} = 19,640 \text{ billion yen.}$$

Adding the value of cash (2,288 billion yen) and cross-holdings (6,845 billion yen) to operating asset value and subtracting out debt (11,862 billion yen) and minority interests (583 billion yen) from this number yields the value of equity. Dividing this value by the number of shares outstanding (3.448 billion) yields a value per share of 4,735 yen, well above the market price of 3,060 yen per share at the time.

$$\frac{19,640+2,288+6,845-11,862-583}{3.448} = 4735 \text{ yen per share.}$$

With commodity companies, the variable that causes the volatility is the price of the commodity. Consequently, normalization with

commodity companies has to be built around a normalized commodity price.

What is a normalized price for oil? Or gold? There are two ways of answering this question. One is to look at the average price of the commodity over time, adjusted for inflation. The other is to determine a fair price for the commodity, given the demand and supply for that commodity. Once you have normalized the price of the commodity, you can assess what the revenues, earnings, and cash flows would have been for the company being valued at that normalized price. With revenues and earnings, this may just require multiplying the number of units sold at the normalized price and making reasonable assumptions about costs. With reinvestment and cost of financing, it will require some subjective judgments on how much (if any) the reinvestment and cost of funding numbers would have changed at the normalized price.

VALUE DRIVER #1: NORMALIZED EARNINGS

A cyclical firm should be valued based on earnings in a normal economic year, not earnings at the peak or trough of a cycle. Looking past the ups and downs of economic cycles, what are the normalized earnings for your company?

Using a normalized commodity price to value a commodity company does expose you to the critique that the valuations you obtain will reflect your commodity price views as much as they do your views of the company. If you want to remove your views of commodity prices from valuations of commodity companies, the safest way to do this is to use market-based prices for the commodity in your forecasts. Since most commodities have forward and futures markets, you can use the prices for these markets to estimate cash flows in the next few years. The advantage of this approach is that it comes with a built-in mechanism for hedging against commodity price risk. An investor

who believes that a company is undervalued but is shaky on what will happen to commodity prices in the future can buy stock in the company and sell oil price futures to hedge against adverse price movements.

Royal Dutch Shell, one of the largest and oldest integrated oil companies in the world, generated operating income of \$64,403 million on revenues of \$381,314 million in 2022. The average oil price during the year was \$100.93 per barrel, but at the time of our valuation of Royal Dutch in August 2023, the oil price had dropped to \$80.78 a barrel. To reflect the lower oil price effect on revenues and earnings, we looked at Shell's history, shown in Figure 11.1, with the average oil price superimposed on the company's revenues and operating income.

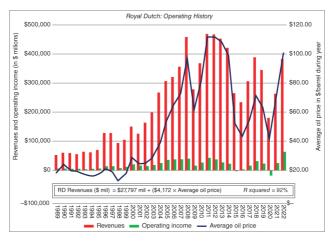


Figure 11.1 Royal Dutch Shell—Revenues, Earnings, and Oil Prices

Using the revenue regression to restate revenues at the current oil price (\$80.78), assuming that revenues grow at 2% a year, the long-term expected inflation in US dollars, and adjusting the pretax operating margins down to reflect the historical average of 10%, we estimate the expected cash flows for the company in Table 11.1.

To estimate the terminal value, we assumed a growth rate of 2% a year in perpetuity, in conjunction with a return on capital of 10%:

Terminal value

$$= \frac{(\text{After-tax Operating income in year 6}) \times \left(1 - \frac{\text{Growth rate}}{\text{ROC}}\right)}{(\text{Cost of capital - Growth rate})}$$

$$= \frac{28,309 (1.02) \times \left(1 - \frac{0.02}{0.10}\right)}{0.0911 - 0.02} = $324,901 \text{ million}.$$

Discounting the expected cash flows at the cost of capital of 9.11% yields a value per share of \$74.60/share.

Table 11.1 Expected Cash Flows (\$ millions) and Value per Share—Royal Dutch

per Sna	re—Roy	al Dutti							
			B	as d yea	r				
Revenue	\$366,29	5 \$373,62	18	381,09	3	388,71	5	396,48	9\$404,419
Operatii	ı § 7.58%	13.79%	1	1.90%	1	0.95%	1	0.47%	10.00%
margin							_		
Operatii	ı § 64,403	\$51,527	\$	45,333	9	342,556	\$	41,528	\$40,442
income							_		
Effectiv	e30.00%	30.00%	3	80.00%	3	80.00%	3	80.00%	30.00%
tax rate							_		
AT	\$45,082	\$36,069	\$	31,733	9	29,789	\$	29,070	\$28,309
Operatir	ıg								
income							_		
+	\$19,410	\$19,798	\$	20,194	9	20,598	\$	21,010	\$21,430
Depreciation									
_	\$22,600	\$23,052	\$	523,513	9	23,983	\$	24,463	\$24,952
Cap Ex							_		
_		\$366	\$	374	9	381	\$	389	\$396
Chg in									
WC									
=		\$32,449	\$	28,041	9	26,023	\$	25,228	\$24,391
FCFF							_		
Termina	.1								\$324,901
value							_		
Return									
on			Ш						

capital					
Cost of	9.11%	9.11%	9.11%	9.11%	9.11%
capital					
Cumulated	1.0911	1.1905	1.2990	1.4173	1.5464
discount					
factor					
Present	\$29,739	\$23,554	\$20,034	\$17,800	\$225,873
value					
Value of\$317,00	Û				
operating	_				
assets					
+ \$40,246					
Cash	_				
+ \$23,864					
Cross-					
holdings					
– \$83,795					
Debt					
- \$2,125					
Minority interests					
Value of \$295,19	0				
equity	0				
Number 395	<u>-</u>				
of 39.	37				
shares					
Value \$74.6	ô				
per \$74.0					
share					
Siluic					

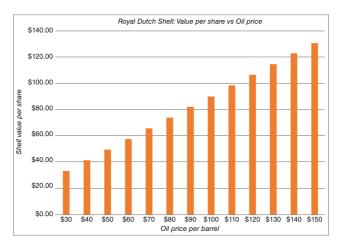


Figure 11.2 Royal Dutch Shell—Value per Share and Oil Prices

This value per share will be a function of oil prices, rising with higher oil prices and dropping as oil prices drop. Figure 11.2 graphs Shell's value per share as a function of the oil price.

In making these estimates of value per share, we restate revenues as oil prices change, using the regression results embedded in Figure 11.1, and hold our assumptions about margins, growth rates, and costs of capital.

Relative Valuation (Pricing)

The two basic approaches that we developed in the discounted cash flow approach—using normalized earnings or adapting the growth rate—are also the approaches we have for making relative valuation work with cyclical and commodity companies.

If the normalized earnings for a cyclical or commodity firm reflect what it can make in a normal year, there has to be consistency in the way the market values companies relative to these normalized earnings. In the extreme case, where there are no growth and risk differences across firms, the ratios for these firms with normalized earnings per share should be identical across firms. In the more general case, where growth and risk differences persist even after

normalization, we would expect to see differences in the multiples that companies trade at. You should expect to see firms that have riskier earnings trade at lower multiples of normalized earnings than firms with more stable earnings. We would also expect to see firms that have higher growth potential trade at higher multiples of normalized earnings than firms with lower growth potential.

VALUE DRIVER #2: COMMODITY PRICES

As commodity prices swing, so will the earnings of a commodity company. For your commodity company, what is a normalized price for the commodity in question, and what is the firm's value at that price?

If you are reluctant to replace the current operating numbers of a company with normalized values, the multiples at which cyclical and commodity firms trade will change as they move through the cycle. In particular, the multiples of earnings for cyclical and commodity firms will bottom out at the peak of the cycle and be highest at the bottom of the cycle. If the earnings of all companies in a sector move in lockstep, there are no serious consequences to comparing the multiples of current earnings that firms trade at. In effect, we may conclude that a steel company with a ratio of six is fairly valued at the peak of the cycle, when steel companies collectively report high earnings, and that the same steel company is still fairly valued with a PE ratio of 15, at the bottom of the cycle, when steel companies report lower earnings.

Table 11.2 reports on pricing ratios for oil companies, using market pricing in August 2023, as well as operating numbers (revenues, earnings, book value) in the most recent 12 months and proven reserves (in millions of barrels).

Table 11.2 Ratios for Large Integrated Oil Companies in August 2023

Company EV/HaV/EHV/EHV/Ehvitaserves

Name						
Saudi	16.70	5.10	4.16	7.95	5.41	11.11
Arabian						
Oil						
Company						
Exxon	8.23	2.10	1.20	5.29	2.02	44.57
Mobil						
Corporation	on					
Chevron	9.82	1.85	1.42	5.92	1.80	61.17
Corporation						
Shell	6.93	1.04	0.68	3.54	1.04	52.24
plc						
PetroChin	a 8.28	0.83	0.47	3.11	0.85	32.91
Company						
TotalEner	gie\(\forall.60\)	1.30	0.71	3.20	1.25	29.45
SE						
BP p.l.c.	5.53	1.24	0.52	2.30	1.21	33.30
China	10.12	0.69	0.26	4.93	0.75	63.22
Petroleum						
&						
Chemical						
Corporation						
Equinor	3.76	1.68	0.60	1.17	1.90	34.36
ASA						
Petrólec	2.70	1.27	1.08	2.15	1.17	14.56
Brasileiro						
S.A.						
(Petrobras						
Occidenta		1.84	2.38	4.61	1.51	39.27
Petroleum						
Corporation						
Eni	5.00	0.85	0.51	3.14	0.88	20.43
S.p.A.						
Median	7.87	1.28	0.69	3.37	1.23	33.83

Looking at Shell, relative to the other oil companies on this list, it looks cheap on some pricing metrics (PE, price-to-book), in line

with the other companies on EV/sales and EV-to-EBITDA, and overvalued on EV/invested capital and EV/barrel of proven reserves. While that may leave you confused, it is the nature of pricing, and one reason to be skeptical, when analysts conclude that a stock is cheap or expensive based on a single pricing ratio. When making comparisons, you do have to control for differences in growth, risk, and investment efficiency. For instance, Petrobras looks cheap on a PE ratio and per barrel of reserves, but its Brazilian presence makes it one of the riskiest companies in the group.

The Real Option Argument for Undeveloped Reserves

One critique of conventional valuation approaches is that they fail to consider adequately the interrelationship between the commodity price and the investment and financing actions of commodity companies. In other words, oil companies produce more oil and have more cash to return to stockholders when oil prices are \$100 a barrel than they do when oil prices are only \$20 a barrel. Thus, these firms have options to develop their oil reserves, which they can exercise after observing the oil price, and these options can add to value.

Even if you never explicitly use option-pricing models to value natural resource reserves or firms, there are implications for value.

- *Price volatility affects value*: The value of a commodity company is a function of not only the price of the commodity but also the expected volatility in that price. The price matters for obvious reasons—higher commodity prices translate into higher revenues, earnings, and cash flows. More volatile commodity prices can make undeveloped reserves more valuable.
- Mature versus growth commodity companies: As commodity prices become more volatile, commodity companies that derive more of their value from undeveloped reserves will gain in value, relative to more mature companies

that generate cash flows from developed reserves. If the oil price volatility is perceived to have increased even though the price itself has not changed, you would expect Petrobras to gain in value relative to Exxon Mobil.

- *Development of reserves*: As commodity price volatility increases, commodity companies will become more reluctant to develop their reserves, holding out for even higher prices.
- Optionality increases as commodity price decreases:
 The option value of reserves is greatest when commodity prices are low (and the reserves are either marginally viable or not viable) and should decrease as commodity prices increase.

If you regard undeveloped reserves as options, discounted cash flow valuation will generally underestimate the value of natural resource companies because the expected price of the commodity is used to estimate revenues and operating profits. Again, the difference will be greatest for firms with significant undeveloped reserves and with commodities where price volatility is highest.

Value Plays

When investing in a commodity company, you are also investing in the underlying commodity. There are two ways you can incorporate this reality into your investing strategy. In the first, you take a stand on commodity prices and invest in companies that will benefit the most from your forecasted price move. Thus, if commodity prices are low and you believe that they will increase significantly in the future, the value payoff will be highest in companies with significant undeveloped reserves of the commodity and the funding to survive near-term adverse price movements. In the second, you accept that you are not a good prognosticator of commodity prices and focus on picking the best companies in the sector. Look for companies that have significant low-cost reserves and are efficient in

finding and exploiting new reserves. To protect yourself against commodity price movements in the future, use commodity futures and options to at least partially hedge your investment in the company.

There are also two analogous investment strategies you can adopt with cyclical companies. The first is to put your faith in your forecasts of overall economic growth. If you believe that overall economic growth will be stronger than the rest of the market thinks it will be, you should buy strong cyclical companies that will benefit from the economic upswing. This strategy is most likely to work in periods of economic malaise, where investors are overreacting to current economic indicators and selling cyclical stocks. The second is a more standard valuation strategy, where you own up to your inability to forecast economic cycles and focus on buying the best bargains in each cyclical sector. In particular, you want to find companies that trade at the same multiple of normalized earnings as the rest of the companies in the sector, while generating higher profit margins and returns on capital on a normalized basis.

The bottom line: no matter how carefully you do your homework, commodity and cyclical companies will see ups and downs in both earnings and prices, as a function of economic and commodity cycles. Ironically, your biggest money-making opportunities come from these cyclical movements.

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Conclusion

Rules for the Road

THE MORE THINGS CHANGE, the more they stay the same. As we employed both intrinsic and relative valuation techniques to value firms across the life cycle from Zomato, a young growth company, to Bed, Bath and Beyond, a company whose best days are behind it, we followed a familiar script. The enduring theme is that value rests on standard ingredients: cash flows, growth, and risk, though the effects of each can vary across companies.

Common Ingredients

No matter what type of company you are valuing, you have to decide what you are valuing (just equity or the entire business), the approach you will use to estimate value (intrinsic versus relative valuation), and the key components of value.

When valuing a business, you can choose to value the equity in the business or you can value the entire business. If you value the business, you can get to the value of equity by adding back assets that you have not valued yet (cash and cross-holdings) and subtracting out what you owe (debt). The choice matters because all of your inputs—cash flows, growth, and risk—have to be defined consistently. For most of the companies that we have valued in this book, we have valued the businesses and backed into the value of equity. With financial service firms, our inability to define debt and estimate cash flows did push us into using equity valuation models.

You can also value a business based on its fundamentals, which is the intrinsic value, or you can price it by looking at how the market prices similar firms in the market. While both approaches yield estimates of value, they answer different questions. With intrinsic valuation, the question we are answering is: Given this company's cash flows and risk, is it under- or overvalued? With relative valuation, the question being answered is: Is this company under- or overvalued given how the market is pricing other companies just like this one? With the example of Alphabet in Chapter 7, the intrinsic valuation approach led us to conclude that the company was overvalued, whereas the relative valuation would have led us to conclude that the stock is fairly or under priced.

In both intrinsic and relative valuation, the value of a company rests on three ingredients: cash flows from existing assets, the expected growth in these cash flows, and the discount rate that reflects the risk in those cash flows. In intrinsic valuation, we are explicit about our estimates for these inputs. In relative valuation, we try to control for differences across firms on these inputs, when comparing how they are priced.

Differences in Emphasis

The models and approaches used are identical for all companies, but the choices we make and the emphasis we put on inputs varied across companies. The value drivers that were highlighted in each chapter reflect the shifts in focus as firms move through the life cycle and across sectors.

Table C.1 Value Drivers across the Life Cycle and Sectors

Category	Value drivers
Young growth companies	Revenue growth, target
	margin, survival probability
Growth companies	Scaling growth, margin
	sustainability
Mature companies	Operating slack, financial
	slack, probability of
	management change
Declining companies	Going-concern value, default
	probability, default
-	consequences

Financial service firms	Equity risk, quality of growth (return on equity), regulatory capital
Commodity and cyclical companies	Normalized earnings, excess returns, long-term growth
Intangible asset companies	Nature of intangible assets, efficiency of investments in intangible assets

These value drivers are useful not only to investors who want to determine what companies are worth investing in but also to managers in these firms, in terms of where they should be focusing their attention to increase value.

And the Payoff

Can you make money on your valuations? The answer depends on three variables. The first is the quality of your valuation. Well-done valuations based on better information should generate better returns than shoddy valuations based on rumor or worse. The second is market feedback. To make money on even the best-done valuation, the market has to correct its mistakes. The payoff to valuation is likely to be speedier and more lucrative in smoothly functioning markets. In more selfish terms, you want the market to be efficient for the most part, with pockets of inefficiency that you can exploit. The third and final factor is luck. While this will violate your sense of fairness, luck can overwhelm good valuation skills. While you cannot make yourself lucky, you can reduce the impact of luck on your returns by spreading your bets across many companies that you have found to be undervalued. Diversification still pays!

Parting Words

Do not let experts and investment professionals intimidate you. All too often, they are using the same information that you are, and

their understanding of valuation is no deeper than yours. Do not be afraid to make mistakes. I hope that even if not all of your investments are profitable ones, the process of analyzing investments and assessing value brings you as much joy as it has brought me.

10 Rules for the Road

- 1. Feel free to abandon models, but do not budge on first principles.
- 2. Pay heed to markets, but do not let them determine what you do.
- 3. Risk affects value.
- 4. Growth is not free and does not always add to value.
- 5. All good things come to an end. Nothing is forever.
- 6. Watch out for truncation risk; many firms do not make it.
- 7. Look at the past, but think about the future.
- 8. Draw on the law of large numbers. An average is better than a single number.
- 9. Accept uncertainty and deal with it.
- 10. Convert stories to numbers.

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